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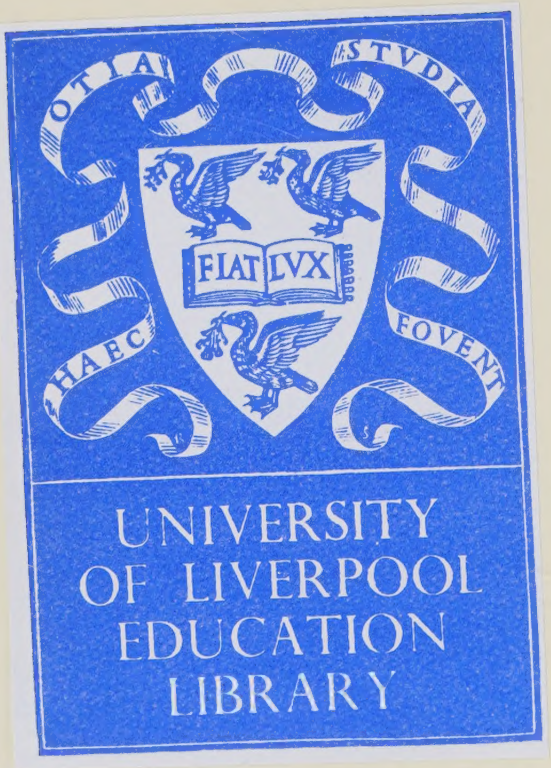

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THE MONTESSORI PRINCIPLES AND PRACTICE

FROM STOCK

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Maria Montessori
Roma 1913

THE MONTESSORI PRINCIPLES AND PRACTICE

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PREFACE

PLATO did a great disservice to humanity when, by banishing from geometry all instruments save the ruler and compass, he crystallised a new distinction between the real and the ideal, between the practical and the intellectual life. In this he was but following, in his own aristocratic way, the highest conceptions of the Greek mind—for the Greeks were a slave-owning race. Thus arose the unhappy divorce between thought and action, between liberal knowledge and useful knowledge, which has always, sooner or later, sapped the vitality of thought itself. And although the renaissances of European thought have in every case been due to the influence of the Greek writings, inspiring great minds with the Greek passion for the exercise of the pure intellect, yet they have always occurred in connection with an intense interest in the actual problems of life. And even in the Universities themselves, in proportion as that interest has declined, and the curriculum has been given a purely disciplinary character, there also thought has lost its vitality.

All this may seem remote enough from the Montessori method as presented in these pages; for what has education up to seven years of age to do with the

highest education of a nation? Yet to the writer its chief importance lies in this, that it may help towards the reinstatement of those elements which have been lost from the Greek conception, and thus help to place education, even the most advanced, on a biological basis, which is, indeed, the only basis suited to a democratic State.

Half a century ago the educational system of Great Britain—if system it could be called—was essentially aristocratic. Secure in their ample revenues, the Universities gave no heed to the material problems on which the welfare of the mass of their fellow-countrymen depended; as in the centuries of Rome's decadence, a nice scholarship, with its artificial refinements, was their highest ideal, and the way to attain it was through disciplinary studies, which were regarded as the more valuable the further they were removed from the real interests of life. The best Secondary schools, always dominated by the Universities to which their pupils were sent, maintained the same traditions of disciplinary studies; and though in the Primary schools—such as they were—the curriculum was frankly utilitarian, yet even there the method—where there was any method—was based on that of the Universities. Alike in the Universities and in the schools, our educational methods were based on the Greek tradition, but they had lost all that was most valuable in the Greek conception. Left to itself, higher education would have become more and more stagnant.

But meanwhile, in the great world outside the Universities, the conception of evolution was revolu-

tionising thought; science was showing the way to new openings in industry; above all, the democracy, as represented by the middle classes, was beginning to make an effective demand for recognition; some measure of reform in education could no longer be delayed.

But the nation was not ready to take a comprehensive view of the educational problem; changes were made piecemeal, here a little, there a little. Thus it happened that although the English Universities, with their conservative traditions, had had no part in these great movements of thought,—although they were bitterly opposed to the new order of things,—yet they still continued to hold a dominant position in the patchwork methods by which the practical genius of the English sought to effect the reform of education. They were singularly unfitted for that position; the aristocratic traditions of knowledge had too firm a hold to be dispossessed, except by the almost irresistible demands of public necessity; and even then the change was less in broadening their ideals than in extending their curricula. And since culture was still to be sought through disciplinary studies, the fruits of which were not apparent until after several years of study, there grew up outside them a strong demand for higher and yet useful education, and technical institutes were established in which the element of culture, not being sufficiently utilitarian, was discarded altogether. A partial reconciliation of the two ideals is now being sought in the endeavour to co-ordinate primary, technical, secondary and university education, room

being made for culture in the lower grades and for utility in the higher, but at the expense of mental discipline, which is now, in many quarters, regarded as a discredited conception.

This patchwork compromise, on the maintenance of which so many millions are annually expended, is wasteful in the extreme—even more wasteful of mental material than of the tax-payers' resources. Broader ideals are needed. Utility must be sought, not only directly, *i.e.* through instruction which can be immediately utilised, but also through disciplinary training; and this training should be of the body as well as of the mind. We have, in fact, to return to what was universal and vital in the Greek conception of education, and to advance beyond it in the light of the wider knowledge of the present day. We must insist on disciplinary studies; but we must use, as the means of mental discipline, studies which are in close and immediate touch with life as it now exists. The *logic* of mathematics, as founded on deductions from axioms and definitions, the grammatical study of languages, and logic itself, these are, no doubt, fine exercises for certain types of mind, but they are not necessary to the highest type—they formed no part of the education, or even of the subsequent mental equipment, of the giants among the Greek thinkers,[1] of whom Aristotle was the last.

[1] It was only in Plato's time that the Greeks began to erect geometry into a science based on deductive logic.

Grammar, as a logical study, was, strange to say, still unknown. Plato, launch a philosophic student of the origin of language and

It does not follow that we are to abandon these means of mental discipline ; the argument is that we must no longer, in higher education, regard them as the exclusive means. Following the earlier Greek plan, we ought to pay more attention to the *content* of the truths discoverable by the intellect ; and, above all, to the proper use of the mother tongue, in which we have an unrivalled instrument of mental discipline, culture and utility combined, and one which is especially important in a democratic State. To analyse the arguments by which men are persuaded to act—to discover the suppressed premises, so that their validity may be examined into—this is a very high type of disciplinary study. Properly arranged, it might become entitled to the old designation of *the humanities*, a group of studies which, in the truer meaning of the word, has never yet been represented in the Universities. Even in these democratic times the State-founded Universities themselves, while they devote a preponderating share of their attention to the proper treatment of the inorganic material of the national industries, have as yet scarce begun to realise that the proper treatment of the human material

one of the greatest of prose writers, announced that there were two classes of words, " words denoting actions, and words denoting those who do the actions," and he adds that a succession of either kind alone is not a discourse ; " it is only when both are mingled that language is formed " ; —and Jowett, his admiring commentator, writes that " he appears to have been wholly unaware of the difference between a root and a termination."

Formal logic was, indeed, known to Aristotle, but only after he had himself discovered its laws.

is at least as worthy of study. There is not in the United Kingdom any University which requires that its graduates—even those whose training is intended to fit them for posts involving the management of large bodies of men—shall have any knowledge of the conditions under which human material is best employed. We pay the greatest attention to the utilisation of even waste products in our manufactories, provided only that the wastage is not of human material. On that all-important subject we make no national attempt to ascertain the facts and principles through the recognition of which alone the wastage can be remedied. Truly our educational system has not even yet escaped from that which was local and temporary in the traditions of liberal knowledge, as handed down by the slave-owning Greeks, though we have lost much of what in their conceptions was valid universally and for all time.

In another respect we fall lamentably below the old ideals. Recent experience and the magnificent results of the early Greek education, in which rhythmic movement played so large a part, indicate that mental power would be directly increased by physical culture, especially that directed to the finer muscles of the body. But quite apart from that, there is a great and easily preventable wastage of our intellectual output, due to our pointed disregard of training in the physical conditions of a healthy and complete life.[1] No doubt objection will be taken to this, for the training of the

[1] Even with our present conceptions, it is something of an anomaly that physical culture finds no place in the work of, *e.g.*, the

senses and muscles has been unduly discredited, partly because it has been applied empirically and by those who do not understand the principles which underlie it, partly because of the inherent obstacles which oppose educational changes, and partly because of the wide-spread belief that the ordinary experiences of life provide all the training that can be required,—a belief which is far too readily accepted, and is in the teeth of the evidence.[1]

There are many influences which are making for changes in education, and not all are in the right direction. But so far as they arise from the recognition of the biological nature of the problem, so far they will not be mistaken. In no method has that recognition been so full and so frank as in that of the Dotteressa Montessori. If the principles which she has applied more fully than any other educationist are recognised in early education, they cannot fail to

Indian Civil Service classes in the Universities, inasmuch as physical fitness is a compulsory subject of the examination for which they prepare, and a considerable number of students, otherwise qualified, fail annually in this subject, often through no organic defect, but only as a result of mere ignorance. No matter how gross the ignorance, no matter how serious the consequences may be, even to the extent of so injuring the health as to render useless all the teaching received at the University, it is regarded as no concern of the University. If the failure were due to any other kind of ignorance, the University would at once take steps to remedy it.

[1] The single fact that colour blindness is so widespread and so seldom recognised, and that much might be done (as it is done in Canadian schools) to improve the colour judgment of the colour blind, may serve as a refutation of this so common belief. See also the discussion, pp. 51–57.

react on all education. The careful attention to the development of the body, if practised in the early years, will draw attention to its importance in the later ones. The successful employment of disciplinary training, mental and physical, which is of the essence of the method, and especially the fact that it is employed in connection with material of living interest to the pupil, will help to reinstate the conception of discipline in quarters where it is now discredited, chiefly because it is employed on subjects which deaden interest. The careful attention to the individual child rather than to the group, and especially the respect paid to his individuality and his right to self-development, cannot fail to react on later education and life, and, by elevating our conception of personality, to assist in forming a healthy public opinion, founded on knowledge as well of principles as of facts, through which many of the injustices and inequalities of our social system may be alleviated.

Nothing has been said in the text of the application of similar principles to the subsequent years of school life, though they are perhaps in even greater need of improvement. Methods so wasteful as those we employ in education are only tolerated when they are time-honoured. Only under exceptional conditions, such as a narrow or shaky bridge, do we compel all traffic to move at the same rate; but with our uniformity of curricula and our method of class teaching, we systematically do our best to reduce the intellectual progress of our children to a uniform level. The injury is great. Active minds are dis-

couraged, nay more, they become idle, superficial and over-confident, because their work is not sufficient in quantity or in difficulty to call for worthy effort; slow minds are even more discouraged, because their work is too difficult—they cannot succeed.

If we were to apply the principle of individual freedom to these older pupils,—and the note on p. 291 indicates that this is not impossible,—there would, no doubt, be a great saving in these respects. Yet, although reform is urgently needed, it is doubtful whether it is best sought in just that direction. For, as will be shown, it is in the earlier years of childhood that the principle of individual freedom is especially applicable; in the later stages of the pupil's life, as in that of the race, it is almost certain that the social instincts should be especially encouraged, though still in an atmosphere of freedom. Thus it is probable that the true direction of advance is to be found in the co-operative educational work of the class. How effective this may be, the success of the "self-government" movement in many schools has amply demonstrated. That the free control of the pupils should have been tried on a more extensive scale in regard to punishment and general school discipline than in regard to any of the intellectual functions of the school, is somewhat remarkable. But evidence of its successful operation in mental education is not wanting, as, where each pupil has been asked to bring to the lesson some contribution culled from the school library. Quite lately, incited by the example of Dr. Montessori, Mr. MacMunn

has tried this co-operative method in a systematic way at the King Edward School at Stratford-on-Avon with results which have astonished him, especially in their inspiring effects on the slower pupils.

He was wise who first gave, as the three conditions of a happy life, Something to do, some one to love, and something to hope for. Nor will the teacher go far wrong who takes this as the motto of his method, remembering always that by the first clause is meant something worth doing, something that we can do, but yet requiring effort enough to carry with it some feeling of achievement in the completed task.

The Montessori method is itself but in the making. Time will probably show the desirability of introducing more of the æsthetic element, and modifications of the educational apparatus may also be found desirable, as further experience is gained with different types of children. In this connection the writer feels bound to express, though with all respect, his view that the restriction whereby only the complete set of apparatus is sold, is undesirable. It is in itself an infringement of the principle of freedom, which should apply as well to the teacher as to the pupil, and it may tend to strengthen the idea, the most dangerous of all to the success of the method, that the secret lies in the apparatus, the whole apparatus, and nothing but the apparatus, whereas it really lies in the intelligent and untrammelled application, by the teacher, of the principles on which the apparatus has been designed. It may, however, be noted, that no licence

or permission is required to manufacture or use any of the apparatus described in M'Clure's *Magazine* for January 1912, since that periodical was available to the public more than two months before the date of application of the patent under which the licence for the manufacture of certain of the apparatus therein described is issued.

Sincere thanks are due to Mr. Bertram Hawker for the photographs from the Montessori School at Runton Old Hall, from which the illustrations in the text have been reproduced; to Miss H. E. Barton for the note, p. 273; to Dr. Walter E. Fernand, of the Massachusetts School for the Feeble-Minded, for his kindness in enabling the writer to procure, from the Teachers' College, Columbia University, a reprint of Séguin's work, so often referred to in the text; and especially to Prof. A. F. Dixon, M.D., for his careful revision of the physiological descriptions in Chap. III.; and to the writer's wife for unfailing assistance in the criticism and revision of proof sheets, as well as for the account, in the note on p. 165, of how a great nature treated a simple situation. But—and this should perhaps have been made more clear—such action is only for those who are reverenced by children.

Acknowledgments are also due to Messrs. Philip & Tacey for their courtesy in permitting the publishers to use the blocks from their illustrated pamphlet of the Montessori Apparatus as sold by them.

CONTENTS

CHAP.		PAGE
I.	Introductory	1
II.	The Predecessors of Dr. Montessori	10
III.	Physiological Education	24
IV.	Spontaneity	62
V.	The Teaching of Writing and Reading	115
VI.	The Principle of Liberty	161
VII.	The Montessori School and Apparatus	208
VIII.	Character and Discipline	277
	Index	303

THE MONTESSORI PRINCIPLES AND PRACTICE

CHAPTER I

INTRODUCTORY

A NEW light has appeared in the educational world. The remarkable advance made by Dr. Maria Montessori, of Rome, in the theory and practice of the home and school education of children up to seven years of age, will ultimately place her name with those of Pestalozzi and Froebel as one of the greatest in the history of educational progress, though injudicious advocacy may long delay the recognition.

This prophecy is justified on two grounds. In the first place, she has devised a method in closer accord with the biological principles of child development than any previously known—a method which, in its practical application, unites the physiological and psychological laws of which, as educationists have gradually been finding out, every rational system of education must take account. In the second place, her method proceeds along the lines which the political development of society inevitably dictates. Long ago

Herbert Spencer pointed out that the type of education always follows the type of society—in a monarchical state, for instance, arbitrary authority will be a far more important factor in school discipline than in a republic. Hence the Montessori method, being founded on the idea of liberty, fulfils an essential condition of democratic education—and the future of all civilised states will be democratic. Furthermore, it seems to offer some security against the danger of democracies, that liberty may degenerate into licence on the one hand and tyranny on the other. For in her little pupils, freedom soon ceases to be licence and becomes self-control, which is developed to an extent very remarkable in such young children. Thus discipline and steady application are obtained practically without the spur of rewards or punishments, save so far as occupation is a reward, and idle playing with toys a punishment.

There is, indeed, nothing new in this Utopian result. In many other schools — notably that of the late Colonel Parker in America — the pupils have been like a happy family, each helping the other, loving their teachers and loving their work so well that no external motive of reward or punishment was needed. But these results were almost wholly due to personal qualities. You read Colonel Parker's book, and you feel that if you were Colonel Parker you might use his methods successfully, but that, being what you are, the attempt would result in chaotic disorder.

No doubt the remarkable results Dr. Montessori obtained are also due in part to her personal qualities.

There are exquisite passages in her writings which no sympathetic mind could study, even in translation, without recognising an inspiration which reveals her as one of those rare spirits whose devotion uplifts humanity.[1] But her success appears to be chiefly due to the extraordinarily thorough way in which she has carried out the principles which have been gradually accepted by careful psychologists as those which must govern the early stages of education. In other words, her method is based on knowledge rather than on intuition.

Thus to pass from the instinctive sympathy of the born teacher to the formulated principles of the scientist is a great step in advance. For while knowledge can never supersede sympathy with the pupil, it can direct it, nay, it can help to create as well as to intensify it. For we grow to love those whom we can help, and to like our work when we know how to do it well; and it is only where we understand that we can truly sympathise.

Dr. Montessori, indeed, brought to the work of teaching scientific qualifications hitherto unequalled among educational pioneers; yet not even Pestalozzi or

[1] It is somewhat unfortunate that Dr. Montessori does not seem to have had any experience of typical modern schools in which good methods are employed, while she has certainly seen some extraordinarily poor ones, and she often writes of these as if she thought they were typical of modern education. This feature in her book is apt to irritate good teachers, making them not only unsympathetic, but hostile and suspicious. A generous recognition of the good work done by other teachers of to-day, such as we find in her acknowledgments of her obligation to Séguin and Itard, would have gone far towards ensuring a more sympathetic attitude on the part of teachers generally.

Froebel seem to have appreciated so fully the uselessness of knowledge without sympathy. We need not wonder. Strange though it may seem, no one has such need to base all his teaching on love, as those who aspire to teach idiots. This was the truth which Séguin, her great master, and the greatest of all the teachers of idiots, preached and practised; as Itard, whose disciple he was, had practised it before him. Séguin never wearies of this theme. In season and out of season—if, indeed, it can ever be out of season—he tells us that unless the teacher can call to the children with a spiritual voice, so as "to lead them forth to lay hold upon the beauty and strength of life," he can never attain to any measure of true success. Almost at the close of his work he says:

"To make the child feel that he is loved, and to make him eager to love in his turn, is the end of our teaching as it has been its beginning."

It was as one of the staff of the University of Rome that Dr. Montessori was brought into contact with Séguin's work. As assistant doctor to the clinic for idiot children she had to visit the asylums of the city, and she became specially interested in the remedial treatment of the insane by thyroid extract, which was then attracting the attention of the medical world, and she was thus led to study the methods of physiological education for the mentally deficient, devised by Séguin. Soon she became convinced that the problem was educational rather than medical, and she brought this view forward in medical circles. At first she did not meet with much support; but having expressed it

in an address on Moral Education at the Pedagogical Congress in Turin, widespread interest was excited, and fortunately the Italian Minister of Education recognised its merit. As a result, she was given the opportunity of teaching in a medical pedagogic institute, where the idiot children from the insane asylums were brought together.

Here she took charge for two years (1898-1900), and either taught or was present from 8 a.m. to 7 p.m. without interruption. Becoming convinced that similar methods would apply to normal children, she then gave up this and all other work to prepare herself for a new task. She registered herself as a student of philosophy; she studied current methods for normal education; but above all, she devoted herself to studying the writings of Itard and his disciple Séguin. Inspired and guided by these investigators she devised a method of teaching reading and writing to idiot children, which resulted in their passing the public examination held for normal children.

While others were marvelling that idiots could be brought to the standard of normal children, she was searching for the reasons why the normal child did not far surpass the well-taught idiots. She withdrew from active work among deficients, giving herself over to meditation and to a deeper study of Itard and Séguin. She translated their works into Italian, copying them out with her own hand, not in order to republish them, but so that she might have time to weigh the sense of each word, and to read, in truth,

the *spirit* of the author. And she was rewarded. "The voice of Séguin," she writes, "seemed to be like the voice of the forerunner crying in the wilderness, and my thoughts were filled with the immensity and the importance of a work which should be able to reform the school and education." For Séguin, the man who for thirty years had studied abnormal children, and had founded a physiological method for their education, had himself expressed the belief that it would in the course of time be applied to normal children. During this period she tells us that she "not only made practical experiments according to the methods of Itard and Séguin, but through reverent meditation absorbed the work of those noble and consecrated men, who have left to humanity most vital proof of their obscure heroism."

This work led to the teaching of Pedagogic Anthropology in the University of Rome; but that was not enough. She had long wished to experiment on the application of her methods to normal children. In 1906 came her opportunity. She was invited to organise the Infant Schools of certain model tenements in Rome. In each school she gathered together fifty or sixty little tots from two-and-a-half to six years of age, leaving them full liberty of individual action. There, for eight to ten hours each day they live and learn and eat and sleep *and teach*. Observe—*and teach*. Not themselves, indeed, but their teachers. That is one of the secrets of Dr. Montessori's success. She brought to her work high scientific attainments and knowledge of physiological psychology; in short,

qualifications and gifts beyond those of any of her predecessors, and then ?—then she let the little children teach her. More fully than any other of the great reformers, she brings us back, through the long centuries in which child nature was misunderstood and mutilated, to another region and an earlier time, when mothers pondered in their hearts the sayings and doings of their children ; when one of the greatest of Jewish teachers wrote that he had learned much from his teachers, more from his fellow-scholars, but most of all from his pupils ; to the time when the greatest of all teachers said of little children, that of such was the kingdom of heaven. In a new sense, and yet not wholly new, she has shown us that except we become as little children, casting off old prejudices and ready with receptive minds to receive the truth as nature gives it to us, we cannot attain to the truth.

Such were the steps by which this devoted teacher trained herself for her work.

Yet the prophecy with which this Introduction commenced may be falsified, the real advance may be lost for the time, and the " Montessori Method " may in a few years be looked on as a fad that has had its day. The danger lies in the direction of too ready acceptance, rather than in that of hasty and ill-considered rejection. The one thing which may postpone for a generation or longer the benefits of the method, is its indiscriminate adoption by blind admirers who believe that they can use the apparatus though they have not grasped the

principles which underlie its efficiency. The mere fact that there is apparatus intensifies the danger tenfold. There are those who will think they can use the apparatus in fewer days than Dr. Montessori took years in which to train herself. To them the apparatus will be everything, the principles nothing. To her the principles were everything, the apparatus was only the outcome and expression of the principles. Mechanical teachers, who, because they are mechanical, will get the worst results from a method which depends more on principle than any other, they are the danger. They will say it is a fad with nothing in it; they will claim that they know because they have tried the method for themselves; and they will claim, too, that their "experience" as teachers entitles them to judge, although to them experience means nothing but a long continuance in routine. The very name "the Montessori *method*" or "*system*" is incurably bad; it is not a method, it is not a system, and those who think it is a system or a method, or something that you do when you get the apparatus—they are the friends from whom we must pray to be saved. It is a living principle, and while it may turn out that the "didactic material" used in Italy is that which we shall find to be most suitable for children in these islands, we must not jump to the conclusion that it will be so. Neither the children nor their environment are the same as in Italy, so that we must solve our own problems for ourselves. Material inventions can be adopted from another country, without modification and without thought,

but great mental principles cannot be applied without corresponding mental effort.

The writer's object has therefore been to treat very fully of the principles which underlie the practice, so that not only teachers, but parents and others in charge of little children, who have made no previous study of education, will be able to apply them intelligently. It has not, however, been thought necessary or even desirable to occupy space with an examination of the objections with which the method has been received in some quarters. It is well that innovations should be submitted to unfriendly as well as to friendly criticism, and it is inevitable that the earlier criticisms should be in part due to misapprehension of the scope and nature of the innovation, alike in regard to the problem it proposes to solve, and to the solution it offers.

CHAPTER II

THE PREDECESSORS OF DR. MONTESSORI

Modern theories of education do not always rest on the sure foundation of established truth; some of them have no doubt been taken up too hastily as a reaction against an opposite extreme. But there is one direction in which education is making sure and steady progress. Its methods are being based on the physiological laws of growth; in so far they can scarcely be mistaken. Like everything else in education, this is no new idea. Ancient education was based to a large extent on the physiological knowledge of the period. But the ancient view was almost abandoned during the long centuries which preceded the modern revival. Educational theories were based on the mental and spiritual aspects of life alone—the child was regarded as a mere personality, not as a growing organism. For many centuries the current belief was that the only way to educate the mind to be able to think was by practising it in thinking. As it is by that belief that the school curricula are still determined, we cannot wonder that it still holds its place in the popular opinion. But the physiological student of mental phenomena - the physiological psychologist,

to give him his proper title—now knows that in the very early stages of life the nervous matter of the brain can be trained or organised by muscular exercises even better than by actual thinking, and that the child whose brain has been so organised will think more effectively than the child whose brain education has been chiefly conducted by practice in thinking. This is one of the principles on which the Montessori method is based.

This principle is, indeed, no new discovery. It was recognised among the Athenian Greeks, as well by the greatest of their thinkers as by the common practice of their education. With them, as in the best conducted reformatories of the present day, moral as well as intellectual development was sought through a physical training, in which the rhythm of both finer and larger muscles had a conspicuous place. They believed that they thus secured the co-operation of action and thought, the fitting of conduct to precept, of words to actions, and that there resulted that harmony between the inner life of thought and the outer life of conduct which formed the ideal of the Greeks before luxury had lowered the standard. Gymnastics, which to us often means little more than the cultivation of the muscles to an unnatural degree of strength, meant to them not only grace, rhythm, skill, symmetry, and agility, but in especial the subjection of the passions to the control of reason, so that a beautiful symmetry of form and face was regarded as the index of a beautiful mind. "Everything that is fair is good," said Plato, "but the fair mind in the

fair body will be the loveliest of all sights to him who has the seeing eye"; and they held that the fair body ministered to the fair mind. But after the golden age of Greece, this high ideal was not maintained: with the advent of luxury, conditions changed; the Greek education failed to form character; and the Christian Church, confronted with the colossal immorality of the Roman Empire, put its ban on all that appealed to the flesh. Under its control, education became wholly literary. The result was a complete divorce between the education of the man of action and of the man of thought. For centuries the soldier and the statesman could neither read nor write, and Europe presented the strange spectacle of two opposite types of higher education, the education of chivalry and that given in the Church schools. Later the two coalesced; and in the Public School education of to-day the literary element is the lineal descendant of the education given by the Church, while the games, and probably such customs as fagging, represent the education of chivalry.

The effective reappearance of the Greek conception of physical training as a means of mental and moral education synchronised with the great awakening of thought which led to the French Revolution. It was Rousseau who preached it so loudly that the world had to listen. French physicians took it up, partly from its medical and partly from its philosophical interest; but it was not until well into the last century that, through the devoted labours of Dr. Edouard

Séguin,[1] it took the definite form in which we know it to-day. Nevertheless, the idea had never wholly died out. Séguin, quoting apparently from a work of Pinel on Mental Aberration, published in Paris in 1791, tells us that long before physicians had thought of drug treatment for lunacy, "Spain had produced several generations of monks who treated with the greatest success all kinds of mental diseases. . . . Certain regular labours, the performance of simple and assiduous duties, an enlightened and sovereign volition, watching constantly over the patients, such were the only remedies employed. 'We cure almost all our lunatics,' said the good father, 'except the nobles, who would think themselves dishonoured by working with their hands.'" Nor was this the only contribution of Spain to the education of deficients. It was doubtless to his acquaintance with a Spaniard, Jacob Rodriguez Pereira (1715–1780), that Rousseau owed the most striking of the physiological ideas in his *Emile*. Pereira, reputed as the first to teach deaf mutes to speak, had moved to Paris with his school; and as we know that Rousseau, who lived near by, was on close and intimate terms with him, we may safely assume that where Rousseau's physiological theories correspond with Pereira's practice, it was Rousseau who was indebted to Pereira rather than the reverse. If Séguin's description of Pereira's work is to be relied on, it is indeed

[1] This eminent Frenchman, after years spent as a teacher of idiots in Paris, emigrated to the United States, and, continuing his work there, he anglicised his name, but the accent is retained in the text, as being the more familiar form for European readers.

of extraordinary interest. He saw that since sound was due to a vibration, the vibration might be transmitted through other organs than the ear, and that the nervous system might perceive and reproduce that vibration even though the ear heard no sound. Ordinary people, he conceived, heard the sound, without, most of the time, noticing the vibration; and if the deaf, who cannot hear, could be got to notice the vibration and then imitate its production in themselves, they would do so by the only way in which they could produce similar vibrations, that is, by the use of the vocal organs. Acting on this principle, Pereira first got into mental communication with his pupils by means of a manual alphabet for the dumb, published in Madrid in 1620, which he followed with a syllabic manual alphabet of forty odd signs of his own invention– that is, apparently, by a phonetic deaf and dumb alphabet— and finally by gesture. Then, when they could understand him, he got them to produce by their vocal organs the vibrations corresponding to the sounds which he produced. Thus, since the vibrations corresponded in their minds to ideas, their language was a language of vibrations, which to the hearer became a language of sound.

"It is thus," says Séguin, "that he practically made his pupils hear through the skin and utter exactly what they so heard"; and it would appear, if the account is to be relied on, that he "communicated to them, not only a natural voice and a correct pronunciation, but even his *accent gascon*, or peculiar southern emphasis. So says every one who has followed his admirable teachings, Buffon, Lecat, Bezout, Diderot, etc."; and Séguin

recounts that he had himself heard, in 1831, the last surviving pupil of Pereira, who came to visit the grandsons of her beloved teacher. " Yes, we heard, decrepit, the voice which Buffon heard in its silvery tones of youth." [1]

Following Pereira came Itard (1775–1838), who in 1799 was appointed Physician to the Paris Institute for Deaf Mutes. Of Itard, Séguin writes that " he was the first to educate an idiot with a philosophical object and by physiological means. . . . Others may have continued his task, even enlarged, completed, systematised it, but we do not know of any one among them who would not gladly exchange his subsequent titles for the authorship of the two pamphlets [1801 and 1807] on the *Savage of Aveyron*. . . . We quit with regret his few unrivalled pages, to follow the evolutions of his idea through other minds, after his bodily death." It was, however, Séguin himself, the great teacher to whom Dr. Montessori owed her inspiration, who first proved beyond all doubt that carefully chosen muscular

[1] The account of Pereira and his relations to Rousseau in these two paragraphs is little more than a précis of Séguin. If adequate, it would appear that Pereira relied solely on *feeling* the vibrations (no doubt at the throat), and did not *teach* the proper positions of the vocal organs. If so, the result indicates an extraordinary sympathy between him and his pupils. Such a delicacy of perception of vibration would far exceed anything of which we read in Miss Helen Keller's account of her delight in the feeling of vibration.

It also bears on certain of the unexplained phenomena for which spiritualists are so ready to suggest their own explanations, because it shows that we normally possess physiological means of discrimination far beyond what we are accustomed to use. This is, of course, a commonplace to the physiological psychologist.

movements might be directly auxiliary to mental development. The following paraphrase from an article of his in the *Archives of Medicine* (New York, October 1879) relates the case of a boy eight years old, who had been idiotic from infancy. Before treatment the boy could control only the movements of the arm as a whole, without power to direct the separate movements of the hand or fingers, nor could he prevent involuntary movements, especially of the wrist. Séguin began the training of the hand by getting the boy to practise movements of the arm which necessarily involved some corresponding movement of the muscles of the hand, and thus he was able to extend, little by little, the power of voluntary movement of the hand. In the course of a year his hand had learned to help himself, to amuse himself, not to put itself in his mouth to be bitten, nor to slap his friends, though it remained subject to its automatic agitation. His senses had been cultivated to the point of being conscious of the ordinary variations of temperature of water, food, etc., and he was able to recognise and name, blindfold, about fifty things by their shape, and quite as many by their texture, and his eye had been drilled so as to recognise objects from drawings, and to cut out shapes traced on paper. In the following year, special attention was given to training the boy's eyes and hands to act in concert. As a result, the power of consecutive thinking was, as it were, created, and he was finally able to enter a school for ordinary children and to do fairly well at his lessons. This little fellow had become idiotic as a result of infantile convulsions.

Before Dr. Montessori learned of Séguin's work, his methods had become systematised in numerous schools for deficients, but it is only method that can be systematised; the spirit which animated the method too often disappears when the method has become established. Séguin's own book, with its revelation of the spiritual side of his method, had been for many years out of print—the "practical man" had written systematic text-books on "the method," and the result was that the theory and practice of the education of idiots made no further advance. In the majority of institutions, as Dr. Montessori writes, the practice was far below that established by Séguin.

But though advance in the treatment of idiots had ceased with Séguin's death, physiologists, psychologists, and educationists were making great strides in other directions. The conceptions of evolution revolutionised the more advanced educational thought. The normal child was no longer considered as a mere personality; it was studied as a growing organism, and the laws of its growth were studied in the light of the history of the race. These advanced thinkers restated the problem of education in physiological terms:—How is the immature baby, with its nervous system, its muscles, its bones, and its internal organs, to be developed into the mature man? With the last three divisions, indeed, the teacher as such has never had any direct concern. With proper food, proper clothing, and proper exercise, the muscles, bones, and internal organs may be left to take care of themselves; or if not, it is a case for the doctor, not for

the teacher. What we distinguish as education proper relates to the nervous system alone. Thus the educational problem is—how can we best aid the development of the nervous system, so as to obtain the best results physical, mental, and moral?

From this point of view great progress has been made in the last half century. The physiological side of the education of normal children has now an established literature of its own. Dr. Montessori scarcely does more than allude to this literature in her account of her own mental development; she arrived at her results by applying to normal children Séguin's principles for the education of idiots, a development which he had himself predicted. Nevertheless, Dr. Montessori's methods are precisely those which serve to carry out the principles established by the study of normal children. Even her fundamental principle of the importance of the spontaneous manifestation of the child had been already established and applied in education by careful psychologists, though no one had suggested carrying it out to its logical conclusion. Every physiological method detailed by Dr. Montessori might have been deduced as a simple application of what was previously known about normal children. That two such different lines of investigation should lead to the same conclusions, is a striking confirmation of their truth. It indicates that the principles on which they are based must have their foundations very deeply seated in the nature of the child.

How are we to explain this coincidence? Why

should the experience gained in the teaching of idiots be so helpful in the education of normal children? Why should it seem to lead so directly, and in the hands of one observer only, to principles identical with those which are being slowly established by the labours of many investigators of normal children? Above all, why should one whose experience was gained in the teaching of idiot or deficient children not be at a disadvantage, rather than an advantage, when suddenly called on to teach the normal child? It seems contrary to common sense that long-continued association with the mentally deficient should be a fitting preparation for teaching children whose minds are of an order so much higher.

Dr. Montessori gives a partial answer to these questions. Following the much fuller discussion of Séguin, she observes that idiocy is, generally speaking, arrested development. Thus there is a striking analogy (pointed out, as she remarks, by Preyer) between the characteristics of the mentally deficient child who has been unable to develop, and those of the normal child who has not yet completed his development. Acting on this analogy, she considered that the methods which made mental growth possible for the mentally deficient (who were in themselves without the inner force which causes self-development), ought to *aid* the development of normal children who do possess that inner force. But that is not enough. It may be true that a child of two or three years of age has points in common with an idiot of eight, but why is it not better to study your

child directly than to study him indirectly through the idiot? And above all, how can experience in the teaching of idiots be any help in teaching normal children? These questions require answers.

There are several advantages in studying the normal child through the idiot or the deficient. In the idiot, the stages of development are passed through so slowly that they can be readily observed in detail. Thus the observer is led to a very thorough analysis of mental processes. And it is exactly this kind of help that the teacher needs. From long practice he is accustomed to accept his own complicated mental processes as quite simple, as things which any one can do. Thus he is very apt to ask too much from very young children, even when he thinks he is careful to guard against it. For instance, no adult untrained in physiology would imagine that to use the hand as we habitually do, directing it by the eye, is a process requiring a very serious nervous effort in those to whom it has not become second nature. Only an exceptionally gifted teacher would get a proper grasp of this from observing the progress of normal pupils. For though they only acquire this power of directing the hand by the eye with an effort, sometimes painful, yet there is nothing to suggest to the ordinary observer that, physiologically, the process belongs to quite a different category from those which train the hand alone. But with idiots, the distinction is forced on the teacher; he cannot avoid it. It took Séguin a year to train the idiot boy's hand, before he could venture to attempt to

direct it by the eye. He who teaches idiots is forced to readjust his conceptions in regard to some of the very prejudices which tell against his success with normal children.

Another reason has been already mentioned. No true disciple of Séguin's could ever ignore the need of sympathy with the pupil. "To make the child feel that he is loved, and to make him eager to love in his turn, is the end of our teaching, as it has been its beginning." Love, guided by knowledge, is the only lever by which to raise the idiot's nature; without it, there is no real and scarcely any apparent progress. But though it is no less the supreme factor in the education of the normal child, the teacher may never discover his deficiency. For his pupils will make progress under almost any system. Especially in the earlier years, the expansive forces of growth, which impel the normal child to use his powers and to develop himself through them, cover a multitude of sins in the teacher. It is the idiot who supplies the true test of the teacher's skill, because he only develops in the most favourable environment.

The third reason, which concerns the spontaneity of the child, bears very closely on Dr. Montessori's work. Here, especially, the idiot calls for the teacher's highest skill, in observing and utilising his spontaneous tendencies. He makes no response to the means we are accustomed to use with the normal child. We cannot direct the idiot's mind into the desired channel by any indirect means. Almost destitute of volition, neither the hope of ultimate reward, nor the fear of

ultimate punishment, can brace him to continued effort. Deprived of all other means, the teacher must rely altogether on the spontaneous tendencies of the pupil. It is no wonder that for Dr. Montessori the importance of these tendencies became the dominating fact in education.

But to establish a principle is one thing; to determine the limits within which it is to be applied is another. Especially is this true in education. For education is always a compromise; the end in view is many-sided, and the teacher has to apply now this and now that principle. It is here that Dr. Montessori shows her individuality. She differs from other teachers not so much in her principles, as in the relentless logic with which she applies what she considers fundamental. It is a strange distinction for a woman, that in dealing with children she should exhibit a degree of logical consistency far beyond that to which any educationist of the sterner sex has attained. No one had ever dreamed of limiting the intervention of the teacher to the same extent. Before her there were many who laid stress on the importance of giving full play to the spontaneity of the child; but of them all, not one had ever had the courage to lay down the revolutionary principle that the teacher must not correct the little pupil, not even in the simplest of mistakes—that instead of correcting, the lesson is to be left over till the next day. Far less had any others the courage to put it into practice. And never was such courage so well rewarded.

How far other teachers, not actuated by equal

faith, equal knowledge, or equal devotion, can venture to follow her example, is a question which experience alone can solve, and each country and each people must solve it for themselves. But however that may be, the work which has been done in Rome has a profound meaning for all who are entrusted with the care of little children.

CHAPTER III

PHYSIOLOGICAL EDUCATION

1. *Outline View of the Nervous System*

"Lead the child, as it were, by the hand, from the education of the muscular system to that of the nervous system and of the senses."—SÉGUIN.

IT is essential that teachers and parents should have some idea of the general arrangement of the nervous system of the body, and of its relation to the other parts of the body.

The nervous system resembles all living tissue in that it consists of cells. These nerve cells differ from other kinds of cells not only in their structure, but in the extraordinary size to which they may attain. While other kinds of cells are more or less uniform in size, a nerve cell, originally of a minute size, and apparently almost as homogeneous in structure as a seed, may, when used, grow to dimensions altogether unprecedented in other cell tissue. All nerve cells appear to be built up on the same original plan and to grow in the same way, though the proportionate amounts by which the different parts grow vary greatly. This uniform plan of growth is easily described. Each nerve cell, as it

grows, sends out on the one hand a number of fine processes by which it *receives* messages from other nerve cells, and on the other hand a *single* thicker process, called a nerve fibre, through which it *sends* messages to other nerve cells or to the muscles or organs of the body.[1] This nerve fibre varies greatly in form and size. Sometimes it is quite short, and gives off many fine branches which intertwine with receiving processes of other nerve cells. Sometimes it may be very long, and may only give off a little brush of processes at the end, as where it abuts on a muscle. For instance, the nerve cells which stimulate the muscles of the foot are situated in the spinal cord, and their fibres extend from the trunk along the leg, all the way to the foot. It is very remarkable that a single cell should extend to this extraordinary length. Whether long or short, the complete cell, with its cell body, processes, and fibre, is called a neuron.

In the brain we find many groups of cells, called nerve centres, which are specially related to either some organ of sense or to some group of muscles. Thus there is a nerve centre for the right eye, and it is connected by means of the motor nerve fibres with the muscles which control the movements of the eye, so that it can send messages to the muscles which move the eye, so as to cause it to look in this direction or that. There are also the sensory fibres along which it receives messages from the eye which, being inter-

[1] In the case of the sensory nerves, the cell *receives* messages carried along its fibres.

preted, tell it not only what objects the eye is looking at, with all their details of colour, shape, etc., but also in what position the eye itself is, and how it is moving. There are similar nerve centres for the other sense organs and parts of the body ; and there is a similar dual relation between every nerve centre and the part of the body under its control—the messages are sent in both directions.

But the great nerve centres of the brain do not exercise a direct control over any part of the body. Their control is indirect, and is exercised through smaller nerve centres called nuclei, situated either in the brain itself or in the spinal cord.

As the nerve fibres from the great nerve centres to the nuclei pass across each other, there is the curious result that the nerve centres on the left side of the brain control the limbs and trunk muscles on the right side of the body, and *vice versa*.[1]

While it appears almost certain that nervous action

[1] Prof. Dixon supplies me with the following interesting extract from Dr. Clifton's translation of Hippocrates' *Epidemical Diseases*, etc., London, 1752. In describing the symptoms of persons injured in the head, he says, p. 199:—"Case thirty-six. Phanius's son and Euergus's, upon the bone being livid, attended with a fever, had a separation of the skin from the bone, but the pus made its way inwards. *Upon applying the trepan*, a thin, serous, palish, foetid deadly sanies came up from the very bone."

"Vomitings came on in these patients, and towards the conclusion, convulsions. . . . *Again, if the wound happens on the right side, the left is affected ; if on the left, the right.*"

The remarkable anatomical fact of the crossing of the nerve fibres was therefore known and actually made use of in diagnosis as early as the 5th century B.C.

in the nerve centres accompanies all *voluntary* movements, and all conscious sensations, it is not probable that we are conscious of all such action, and it is quite certain that a great deal of the control exercised over the body by the nervous system is effected without requiring the intervention of the great brain centres at all—that the nuclei can act as it were automatically. Similarly, when by constant practice an action originally voluntary has become so habitual that it is done automatically, it is not unlikely that, in many cases at least, the great nerve centres are no longer necessarily concerned in it—that all may be done through the nuclei. The current gets short circuited, as it were.

Besides being indirectly connected through the nuclei with the various parts of the body—the sense organs, the muscles, and the viscera—the various nerve centres are very directly and intimately inter-connected with each other through the nerve fibres which pass from one group to another.[1]

It is difficult to remember the relations of the various parts of the nervous system to each other and to the body from a mere verbal description. The analogy and contrasts between the organisation of the body and that of an army may help to make the matter clearer.

[1] It is interesting to observe that while in monkeys there is only a very small part of the brain which has not some ascertainable relation to some particular part of the body, in man there is a considerable volume which does not appear to have any such definite functions, and this portion in man is probably concerned in those higher processes of thought and emotion by which personality manifests itself.

We may set out the correspondence in parallel columns :

(*a*) Commander-in-Chief.	(*a*) Personality which directs the whole body.
(*b*) Headquarters Staff, with its various separate departments.	(*b*) Various nerve centres in the brain.
(*c*) Brigade Generals, Regimental Officers, etc.	(*c*) Nuclei controlling the muscles and organs of the body.
(*d*) Masses of troops, *e.g.* Brigades, etc.	(*d*) External organs of the body, *e.g.* limbs, etc.
(*e*) Field Telegraph Message Carriers, etc.	(*e*) Nerve fibres.
(*f*) Scouts by which the army gets into touch with the enemy.	(*f*) Organs of sense.

Further analogies and contrasts may be noted :

As the Commander-in-Chief knows very little of the innumerable occurrences in the army, so a vast part of our life is outside our consciousness ; we know nothing of it.

Just as the Commander-in-Chief transmits his orders through his staff, with the members of which he is in the closest touch, so the personality acts through the brain, and thus deals with the several organs of the body. The analogy between the Commander-in-Chief and the personality cannot be carried at all as far as that between the departments of the staff and the various nerve centres in the brain, for the latter occupy their own separate regions in the brain, while it seems certain that there is no one locality which the personality occupies to the exclusion of all other

functions. The question touches on matters which are at once too difficult and too controversial for incidental discussion in these pages, especially as it does not lead to any practical result in education.

Again, as the scouts of the army are not in *direct* communication with the headquarters staff, so in man none of the organs of sense is directly connected with the brain.

Yet another analogy. When the brain sends orders to the limbs and the muscles of the trunk, it has to communicate with them through the appropriate nucleus, which thereupon sends on the message to the limbs, for there is no direct communication between the brain and the limbs. Just so when the Commander-in-Chief or the staff desires to send an order to the soldiers of the brigade, they will send it through the general, who will transmit the message in the proper form. Moreover, there are many matters in connection with the brigade for which the general takes full responsibility, not thinking it necessary to consult with the staff. Just so, there are many matters connected with the body for which the nucleus takes full responsibility, not troubling the nerve centres at all. This includes not only such internal actions as swallowing, but also such muscular adjustments as those in walking.

The contrasts are even more important than the analogies. They relate, as has been said, chiefly to the way in which messages are transmitted. If the Commander-in-Chief desires a brigade to advance ten miles, a single order to that effect is sent by the proper staff officer, and, so far as either of these two is con-

cerned, that is the end of it. But with the brain or nucleus it is quite different. It has to continue saying "Go on" for the whole period of the motion. The moment the nerve current ceases to stimulate it, the muscle ceases to act.[1] Similarly the organs of sense have to keep on sending their messages continuously. And this helps to explain two other remarkable contrasts. If the army has to march at express speed for a long time, it is the fighting element which tires first—it is just as easy for the staff to order a fifty-mile march to be done at a pace of five miles per hour as a one-mile march at three miles per hour. But in the organism it is just the reverse—it is not the muscles that get tired first, but the nerves. For as the nerves have to keep stimulating the muscles all the time, it follows that the more severe the effort of the muscles the more energy the nervous system has to expend in stimulating them. The nervous impulses thus sent *to* the organs of the body, directing them to move in this way or that way, are termed *efferent* impulses, or efferent nerve currents, or, more familiarly, motor impulses, because they are the impulses which control the movement.

But the brain has not only to send a continuous set of nervous impulses to the various organs, it has also to receive a continuous set of nervous impulses from them,

[1] While this is true of all the voluntary muscles, it is not universally true. The muscles of the heart will continue to do their work after all the nerves to them have been cut, and the function of the vagus nerve is to prevent the muscles working too strongly—it does not stimulate, it inhibits.

by means of which it is kept informed of what happens in the external world. These are called the *afferent*, or the sensory, impulses, because they are the impulses by which we receive sensations and, in addition, much information that does not rise to the level of conscious sensation. For example, when we walk over an apparently level meadow by daylight we are quite unaware of the fact that our eyes are continually sending messages defining the unevennesses of the ground to the visual nerve centre, and that centre transmits them, in properly modified form, to the nerve centres controlling the various muscles by which the body is balanced. It is only when we walk over the same meadow in the dark that we become aware how much the smoothness of our daylight walk was due to this unconscious co-operation between the sensory and the motor nerves. As these nervous impulses are continually passing in opposite directions between the organs and the nervous system, it follows that there must be two sets of impulses. This is a second contrast to the arrangement in the army where the same messenger may be used to convey dispatches to and from headquarters. It has less educational significance than we might suppose at first sight, for we cannot infer that it is possible to educate the organs of sense separately from teaching the control of the muscles. For though each organ and each muscle has a separate nervous control, both sets of nerves are so accustomed to act in co-operation that it is not possible to isolate one from the other. Even when we believe that we are practising an organ of sense

alone—*e.g.* in looking at a moving object, we are at the same time practising the muscles of the eye in making the responses appropriate to the sensory stimulus, *i.e.* moving it so as to follow the object. And, generally, when we use an organ of sense in order to observe anything, we must keep it adjusted to the point of observation by means of the muscles which control the organ itself. Similarly, when we use the muscles to do anything, we have to direct them in accordance with the information we derive from the organs of sense. It is only when we use words loosely, and with a view to broad distinctions, that we can speak of sense training and muscle training as if they were two separate parts of education.

The real educational significance of the facts in the preceding paragraph lies, not in the separation of the sensory and motor nerve currents, but in their interdependence. Without the co-operation of the sensory nerve currents we are unable to direct the motor currents properly. A familiar example may help to explain. When the fingers are warm, it is quite easy to button a coat without looking at them. When they are very cold, it is difficult—they seem to move clumsily. It feels as though the difficulty was in the motor department—we cannot make the muscles do what we want, we cannot send the proper nervous impulses to them. That is a mistake. The difficulty here is on the sensory side. The nerves at the finger ends are numbed, and do not send the proper sensory impulses to the central nerve, which is thus left without sufficiently accurate information to enable it to direct

the muscles. As a result, the fingers are moved too much or too little, or in wrong directions. (Even in willed movements, as where we try to move two fingers in directions at right angles to each other, the difficulty may be due to sensory defect. There is not indeed any visible organ of sense involved, but every such movement depends for its guidance on the sensory nerve currents which inform the central nervous system of the positions and velocities of the moving parts.)

Another instance of the dependence of motor on sensory impulses is found in the fact that we " start " at a sudden sensory impulse of unusual strength, *e.g.* a loud noise,—and, of course, a start is the result of a motor impulse.

In ordinary life, there must, no doubt, be many cases in which the difficulty of making the proper movement does lie on the motor side, but it is not so easy to identify them. A probable instance is to be found in the familiar fact that we cannot write properly when tired out with, say, a long run—the pen seems to jerk about of itself every now and then as though it were not under our control. Here there is much less reason to think that the sensory impulses from the finger tips are disturbed, and we may assume that the imperfection is due to derangement in motor nerve currents.

The interdependence of the two sets of movements is, however, so intimate that it is almost certain that a deficiency in the motor system may be taken to imply a corresponding deficiency in the sensory system. The

educational application is evident enough, on the theoretical side at all events. It shows that we must beware not to ask the motor nerves to make adjustments for which the sensory nerves do not supply the proper data.[1]

The fact that the nervous impulses have to travel *continuously* has a very intimate bearing on mental education, because of its connection with fatigue, for fatigue increases the difficulty of learning. Physiologically, the increased effort necessary to overcome the difficulty must be in some way connected with increased difficulty in getting the nervous energy to pass along the nerve paths relating to what we are thinking of. So far as we can represent the unknown processes within the brain to ourselves, there seem two possible explanations of this increase in the effort required. Either the resistance of the path along which the nervous energy has to pass may have been increased, or the store of nervous energy available to send the discharge along the path may have decreased. Somewhat more is known about the action of the first cause than about that of the second. Nerves cannot carry nervous discharges along their substance without constant loss of nervous material. If that material is not renewed as fast as it is expended, the resistance to the discharge of nervous energy through the nerve is

[1] It is well, however, to observe that the gradual improvement which training effects in the sensory and motor nerve-systems, is for the most part, at all events, due to the growing organisation of either the nerve centres or the nerve nuclei, rather than to greater sensitiveness in the sense organs or in the nerve endings at the muscles. This will appear more plainly in the next section.

increased. This is doubtless the explanation of the fact that after a long spell of light work we may feel tired of it, though we do not ourselves feel tired—we feel full of energy when we turn to some other kind of work. The light work has not sensibly lowered the general store of nervous energy, but the paths along which the small discharge has been for so long continuously passing have become temporarily worn out, and need an interval for recuperation. It is quite different with the fatigue which follows a very long spell of hard work. Then we are fatigued all over. We want to rest; it is no relief to turn to another occupation. Here the available store of nervous energy is so exhausted that we are unable to overcome even the resistance offered by a path which has not been used at all in the day's work.[1] Observe, too, that it is the store of available energy which is exhausted, not the total store. In fatigue, nature seems to provide against too great exhaustion of nervous energy on ordinary occasions, partly by keeping a large stock in reserve, and partly by providing that when the store of energy gets too low, the resulting fatigue prevents our continuing the work. If a supreme effort is required, the apparently exhausted man will make a new start and work on far past his ordinary limit of strength. Later, when the strain is over, there may be a nervous breakdown, a sure sign either that the reserve store has been drawn on to an excessive degree, or that the nerve paths have been seriously injured. The same thing may happen

[1] There is, however, reason to think that the resistance of all paths is increased as a secondary effect of the prolonged exertion.

from frequent small encroachments on the reserve store of energy. It is easy to understand how this may injure the general health, when we remember that all the vital processes of the body, including the beating of the heart, and the secretions and movements of the viscera, are carried on under and in accordance with the directions received from the brain through the appropriate nerves. If the energy available to send the proper nervous discharges along the nerves of the sympathetic system be insufficient, derangement of the great viscera is the inevitable result. And nature provides but slight safeguards against this, for we are unconscious of these perpetual nervous discharges, and only become aware that they have become disordered when the mischief has gone on so long that serious results have ensued.

The importance of keeping up the general store of nervous energy is not always sufficiently recognised in the school, especially in connection with physical exercise. The recess for gymnastics does not rest the pupils nearly as much as many teachers expect, because of the general drain of nervous energy involved. Sometimes, indeed, it seems actually to tire them for mental work. We then infer that the advantage derived from resting the nerve paths used in the school work is not sufficient to compensate for the general loss of nervous energy due to the physical exertion. Play is generally much more restful than gymnastics, which, unlike play, often require a considerable mental effort.

Very little is known of the physiological basis of

fatigue, except that a certain toxin in the blood will cause fatigue.[1] The statement is put in this restricted way because it is quite certain that the feeling of fatigue is not proportional to the amount of toxin in the blood. It is especially unfortunate that there is no known test which distinguishes between injurious fatigue, from which the subject takes an abnormal time to recover—or perhaps may never wholly recover—and healthy fatigue or even mere

[1] This has been proved by transfusion of blood from an exhausted to a lively dog, which thereupon exhibits all the symptoms of fatigue. The toxin, whose existence in the blood is thus proved, is, as we should expect, one of the products of the natural disintegration of our tissues, which goes on continuously day and night; it is continuously removed by our scavenging apparatus, which also works day and night. When the waste products are produced faster than the scavenging apparatus can remove them, the toxin accumulates and we feel fatigue. This is probably the explanation of the common experience that he who starts off with great energy to undertake exceptional physical toil without preliminary training, becomes greatly fatigued after a short time, but if he persists the fatigue may pass off. For example, he who, after a sedentary life, starts for a long walk at five miles per hour, may feel wearied out after two or three miles, but if he keeps on till he begins to perspire, the fatigue soon passes off, and he steps out for miles with renewed vigour. He became wearied at first because his scavenging apparatus was not equal to the sudden call upon it, and therefore his system got clogged up with waste products. The perspiration was a sign that the scavenging apparatus had got into full working order, and the weariness passed off with the removal of the accumulation of débris from the blood. Had he set out at three miles an hour he might have worked up to five without feeling any special weariness, because he would have brought the scavenging apparatus into action *pari passu* with the disintegration of the tissues. *Festina lente*, as the Latin motto says; *Ohne Hast, ohne Rast*, in the German; these, and our *slow but sure*, all depend on the same physiological principle.

ennui, except that the last named usually passes off very rapidly if a new interest presents itself. Physiological tests—such as the least distance apart at which two sharp points pressed against the skin are felt as two separate points; or tests of the power of converging the eyes, and so forth, are, no doubt, of service in formulating general laws of fatigue ; so also are mental tests, such as the amount of work done or the number of mistakes made in a given time ; but they are very uncertain guides as to the character of the fatigue, and they are very uncertain as guides to the fatigue of an individual pupil, unless he is unaware that he is being tested.

2. *How the Nervous System is developed*

All teachers should understand the process by which the nervous system is developed. Speaking generally, the most important property of the nervous matter of the brain is that it only becomes organised through use. This has been demonstrated experimentally in the case of dogs. A physiologist took a litter of nine puppies. These were divided into three groups. The first group was pampered ; its wants were always anticipated, so that none of the group ever had to exert itself. The second group was treated as ordinary puppies are. The third group was exercised and trained in every possible way. After three months, the puppies were painlessly killed and examined. The brains of the first group were hardly developed at all ; those of the second group showed the normal develop-

ment at three months ; those of the third group were far more developed.

But this experiment, interesting though it be, does not bring out the especial point of Séguin's physiological education. He first applied the principle that although the brain may be partially developed by muscular action, there is an especial relation between the training of the hand and the development of the mental functions of the brain.

There are many evidences of this. In early infancy the hand supplies the best index to the character and condition of the brain. The surest and the earliest sign of mental deficiency is deficient power of grasping. If the hand be flapped about or vibrated instead of being employed to seize an object, the child will probably grow up as an idiot unless appropriate means of physical education, and especially of hand-training, are adopted. Early want of dexterity, *e.g.* in catching a ball, is generally associated with imbecility or mental backwardness, and here also the early education should be physical rather than mental. Another sign is when a large number of false or unnecessary movements are made, such as shaking the whole arm, or partly closing the fist when putting out the hand to seize an object. This lack of control is usually due, not to a defect of the muscles, but to a defect of the nerves. In most cases the muscles are in fair order. If they received the proper stimulations from the nerves, all would be well. Sometimes the stimulation is insufficient for want of nervous energy. Then only a weak movement ensues. Sometimes the defect is that it cannot be sufficiently

finely divided—the organisation of the nervous system is so low that a stimulus cannot be sent along the required nerve fibre without an overflow passing along nerve fibres connected with other muscles so that they also are moved, and we get what are called false or superfluous actions. It is, indeed, beyond all doubt that in early infancy any marked deficiency in manual dexterity implies a deficiency in the development of the higher parts of the brain, with a corresponding deficiency in mental power ; and, further, that in such cases the brain must be educated through the hand before it can be educated through the ordinary mental channels.

But the connection between the hand and the higher functions of the brain does not terminate with infancy. It is well known that the nerve centres for speech—there is more than one little region of the brain concerned in speech—lie on one side or other of the brain, according as the right or the left hand is the most used. Owing, therefore, to the crossing of the nerve fibres already mentioned, the speech centres in right-handed people usually lie on the left side of the brain, and they are very intimately connected with the nerve centre which controls the right hand. In left-handed people they are similarly related to the nerve centre for the left hand.[1] Whatever be the reason of this inter-dependence

[1] This has been established by post-mortem examinations of those whose brains have suffered injury from one cause or another. For instance, right-handed persons lose the power of speech if they have a lesion on the left side of the brain provided, of course, that the position of the lesion is in the part of the brain which controls the organs of speech. A corresponding lesion on the other side of the

of the hand centre and the speech centres, it assuredly indicates a very close relation between the hand and the reasoning powers, since the latter are so intimately connected with speech.

Nor is direct evidence wanting. Experiments have been made to ascertain whether there is any connection between rapidity of muscular action in the hand and the degree of intellectual progress. It was found that, as a rule, those children whose movements are quick are brighter mentally than the slow movers. Two hundred children were divided by their teachers into two groups, the *good learners* in one group and *backward* in the other, and then examined as to muscular control of the hand; 62 per cent. of the *good learners* were found to be quick with their muscles, 30 per cent. were normal, while only 8 per cent. were slow. On the other hand, in the *backward* group, there were none who were quick in muscular action, only 25 per cent. possessed normal control over their muscles, 35 per cent. were slow, and 40 per cent. were strikingly slow and halting in their movements.

Another very remarkable fact was first brought out by the measurements of certain Frenchmen. They have shown by tests with a dynamometer that while the civilised races are inferior to the uncivilised in strength of the leg, they are distinctly superior in strength of the hand. Other experiments, comparing

brain does not affect speech in them- indeed it seems to have little or no effect of any kind. But in left-handed persons it is just the reverse; speech is lost if the lesion be at the speech centre next the centre for the left hand—a lesion on the left side produces no apparent effect.

individuals of different classes, have shown that the pressure produced by the effort of flexing the fingers is less with labourers or artisans whose profession is exclusively manual than with those whose work requires less muscular force but more intelligence, and, further, that the muscular power is greatest with those of the liberal professions involving most thought.

The connection of the speech and hand centres in the brain appears to be a natural result of the evolutionary development of the race. In the first means of communication, the language of gesture must have taken a prominent place. It is a natural language and is still used by us, both as an accompaniment of speech and as a substitute for speech; and the fact that in times of great emotion or sudden shock we express ourselves but in gestures and exclamations, not in consecutive words forming sentences, is almost a proof that these were fundamental activities, and prior in race development to speech as we now know it. Even yet the hand is used for many purposes of speech. No one who has seen two Frenchmen conversing in an animated way can doubt how intimately it has entered into their thought. There are indeed strong reasons for thinking that gesture was the immediate forerunner of speech—the parent, in fact; in early years, too, the centres for the hand and for speech are so closely connected that it is often impossible to stimulate the one without stimulating the other; a fact which, as has been pointed out, is no doubt the explanation of the general habit of putting out the tongue when

learning to write in the common way. For the very strong stimulus of nervous energy which is applied to the nerve centre directing the hand spreads to and stimulates the adjoining region of the tongue centre in the brain and stimulates the tongue. Moreover, since the stimulation is an indefinite one—*i.e.* not directed to any special action—it results, as we should expect, in one of the earliest of tongue movements, that of protruding the tongue, as dogs do. Gradually, with further practice in writing, it becomes possible to restrict the nervous energy to the proper path so that the leakage to the tongue is stopped, and there is a great economy of nervous energy.

The relation of the hand to thought also admits of a simple evolutionary explanation. When mankind began to walk on two legs instead of four, the hands became free for other purposes. Each new purpose presented a new problem to the brain, for the hand could be of service only in so far as the brain was able to direct it. But it was the power to grasp with the hand, and so to use a tool easily, to which we owe the greatest advance.[1] In monkeys this power just exists; in man it is fully developed. The difference between the monkey's hand and the man's hand depends chiefly on the flexibility of the thumb. In man, the thumb

[1] This theory is a very ancient one, dating from the fifth century B.C., when Anaxagoras argued that the mental superiority of man was due to his possession of a hand. In later times, Franklin elaborated the idea of the tool-using hand; and the theory of evolution has supplied a scientific foundation for the speculation of the Greek philosopher.

can be moved laterally across the palm of the hand; it is not so in monkeys. As the rhyme runs:

> "There lived an ape in days that were earlier,
> Centuries passed and his hair became curlier,
> Centuries more and his thumb got a twist,
> And he was a man and a positivist."

The innumerable and complex purposes to which the tool-using hands of man could be applied demanded correspondingly complex thought for their attainment, and nature responded by developing the brain *pari passu* with the development of the hand. An illustration may help to explain this. Consider for a moment the evolution of the staff of an army. Where the number of the warriors is very limited, where all are of the same kind and armed in the same way, the staff is non-existent—the possible combinations are so few and so simple that one man can easily think them all out. But as the number of soldiers increases, as the commander has to deal with infantry, cavalry, artillery, and with the immense facilities for transport which modern conditions afford, the difficulty of the problem increases in the most astonishing way, because the combinations which are open to him are almost endless in their complexity and variety. For one man to control them in detail would be out of the question. A general staff is required in order to deal with the details, in order to arrange them so that the problem which is finally presented to the Commander-in-Chief shall be simplified as much as possible; and even then it requires a mind which has been trained by an exhaustive study of war. Thus we see that the com-

plexity of thought which is now connected with modern war is a direct consequence of the complexity of the possible combinations from which the general may have to choose, and the variety of the means by which he can effect his purpose. Similarly, we explain the extraordinary effect which the possession of the hand must have had on mankind. For the muscular system, with the bones on which it acts, bears somewhat the same relation to thought that the soldiers and material of war bear to the plans of the general. And what an immense complexity of action has not the possession of a hand made possible? Thus we see that in the earliest history of mankind all that could be called intellectual must have been connected with the hand, the instrument of all those activities which distinguish man from the brute. And in the later stages, both directly and indirectly, it has been the chief factor in increasing the possibilities of life for man, for it has made possible the use of tools, and with tools the possibilities of life are multiplied a thousand times a thousand fold. Each new possibility is a stimulus for thought, each new complexity of action introduces of necessity fresh complexity into thought.

3. *Brain Development through Sense Training and Muscle Training*

The theory of the preceding section, while it explains the immense importance of educating the hand as an aid to mental education, serves also to indicate its probable limitations, for it was in the earlier stages

of the development of the race that the hand played the chief part in the organisation of thought. With the use of tools another distinctively human factor must have become of great and, later on, of paramount importance — the power of anticipating in thought the result of this or that combination. Thus the suggestion to the teacher is—educate the brain chiefly by the hand (and, in a less degree, by the muscular adjustments of other parts of the body) in the earlier stages only. In the later stages, educate chiefly by mental means. In adapting her methods to children of under seven years of age, Dr. Montessori has recognised the limitation here implied.

The two aspects of education just referred to may be shortly described as muscular and mental—training in skill, and training in knowledge ; but, of course, there is no sharp line of separation. In learning to ride a bicycle we must use the first method, and we may use the second. We must use the first ; we can only acquire the art of balancing by practice, and when we have acquired it, we cannot express it in intellectual terms—that would require an entirely different kind of training. After we have learned the art, a long course of careful self-observation might enable us to connect the sensory indications which we receive from the movements of the bicycle with the motor adjustments by which we respond to them ; but it is a very troublesome business. The few who can do it successfully are those who can really *teach* the art, provided that they can also put themselves in

thought in the pupil's place.[1] One or two points are, however, readily observed, *e.g.* not to press on the up-going pedal—an almost invariable fault of beginners because they use the feet to balance themselves. Practice is, of course, necessary in order to enable us to acquire the habit of lifting the foot so as to prevent this; but in so far as our action is guided by our knowledge of what we ought to do, we are acquiring the art in quite a different way from before—and, as experience shows, we learn it more quickly.

Either of these methods develops the brain, though one is a far higher type than the other—one is on the perceptual level, the other is on the higher level of conscious thought; one is characteristic of the entire animal world, the other, at least in its higher manifestations, is especially characteristic of the human part of that world. The difference between the two levels is very important. We have an excellent example of the process by which skill is acquired on

[1] This point is well illustrated in the published letters of Miss Fay, an American musician, who became a pupil of Deppe, in Berlin, after she had studied with Liszt himself. To her dismay, Deppe made her begin over again as what music master does not? But in this case it was worth the two years he required from her, for, as she tells us, Deppe differed from all her other teachers. When she came to a passage into which she could not put the expression she wished, they could only tell her to keep on practising and it would come to her some time. But Deppe would sit down and watch her till, seeing for himself wherein she was not sufficiently prepared, he would explain her difficulty, and if necessary give her some special movements to practise before again attempting the piece. Then, when she came to play the piece again, she found that her difficulty had vanished.

The quality of analytical observation possessed in so high a degree by Deppe is but very rarely found in artists.

the perceptual level in Prof. Lloyd Morgan's account of the way in which his dog educated itself to open a gate. When the dog's education was completed, he used to walk straight to the gate, put his nose under the latch, lift it up, push the gate open and walk out. Not unnaturally, a countryman looking on said, "Clever dog that, sir, knows exactly what he is doing." But apparently that was exactly what the dog did not know. He had learned the art very gradually. Imprisoned by the gate, and greatly excited by the sight of a cat on the road, he had one day poked his head through, here, there, and everywhere, and at last, by a happy chance, had poked his nose in at the right spot and then jerked it upwards, releasing the latch, and so had opened the gate. At once he rushed out, and the cat rushed away; he showed no surprise, he never came back to examine the gate and see how he had got out. Time after time the same thing happened, and it was only very gradually that the dog left off poking his head at the part of the railing remote from the gate, and so got nearer and nearer to the right spot. At long last he became perfect—always putting his nose in the proper place. There was no sudden realisation—and all the evidence went to show that he never reflected on the connection between the latch and the opening of the gate, just as we never reflect on the way we learn to keep the bicycle from falling. He learned to open the latch just as, and just as gradually as, we acquire skill in a physical exercise.

A further illustration may help to make clearer not only the difference, but the relation between the per-

ceptual level and the higher level, and it is especially interesting because of its bearing on the question of a dog's mental life. There are those who hold that all the dog's "knowledge," as we call it, consists of this kind of blind mental action, that he never recalls the past or anticipates the future, but lives and acts in the present. This hypothesis is not so impossible as it probably appears to the lover of dogs, who is almost certain to interpret their feelings by his own. There is no justification for such interpretation, because it is almost certain that the mental life of two organisms so diverse in the nervous structure of the brain as men and dogs must be exceedingly different. One case within the writer's experience seems to show clearly enough that dogs may advance far beyond the perceptual stage. A dog, half Yorkshire and half Skye, belonging to the writer's daughter, and devotedly attached to her, used to get very disconsolate when her trunk was being packed for her school journeys, because, as we should say, he knew he was going to have an unhappy period of separation. But that does not necessarily imply anything beyond the perceptual level—it does not imply a conscious picture of the future. For all animals, except perhaps the very lowest, change their behaviour in response to anything which is usually followed by unpleasant consequences, as well as to actual hurt or pain—just as we protect our eye by lowering the eyelid on the sign given by a body moving towards it. This is a mere perceptual response ; it does not imply any conscious anticipation of the future. Similarly, what we call the

sorrow of the domestic dog *may* be merely a perceptual response, without any element of anticipation—somewhat like the dull, low-spirited feeling we often have on a dull, oppressive day. But after she had finally left school she was going on a visit and taking the dog with her. All her attempts to tell him that he was going with her failed to cheer him in the slightest; it was evident he could not understand, and he moped more than ever, perhaps hurt by his mistress' cheerfulness. But when he saw her put his brush and comb in her trunk, his spirits returned at once. It seems hard to understand this except as a case of "understanding," or "putting two and two together." (The dog is in many respects rather stupid.)

From our point of view, the importance of the discussion lies in showing how close is the relation between the two types—that there is no clear-cut line of division; that the lower gradually rises into the higher type. Thus it prepares us to accept, as our most probable conclusion, the hypothesis that the higher type of mental action requires, as a precondition of its appearance, long and continuous experiences on the lower or perceptual plane, and that within certain limits the efficiency of life, even on the higher plane, is dependent on our efficiency on the lower plane—that, on the whole, the people whose senses give them the most delicate indications of what is passing around them, and who are most skilful with their limbs, especially their hands, are likely on the average to attain a higher standard of intelligence—to grasp a situation more rapidly, to see a point more quickly.

4. *The Need for Special Training of the Senses.*

But admitting that quickness and skill on this perceptual level are desirable, are we to conclude that special training is necessary to secure them? It is necessary to discuss this, because there are many—indeed they comprise the great majority of mankind—who act as if it was quite unnecessary to give deliberate training on this perceptual level, or even on the somewhat higher level of conscious training of the senses and the muscular system. They appear to believe that life gives sufficient practice—that the child's everyday contact with the world in which he lives does all that need or can be done for the education of the senses or the general muscular control. Yet nothing is further from the truth, and the strange thing is that mankind is aware of it all the time—aware of it, though not alive to it. This can be shown by instance after instance. Every one knows that through the study of music, the ear is trained to greater delicacy of perception for differences of tone—that the music of an orchestra, which to the untrained ear is a vast volume of harmonious but indistinguishable sound, appears to the trained ear an harmonious blend of distinguishable parts. Again, to take a simpler instance, the untrained ear is unable to distinguish the difference between two notes, one of which is at once recognised by the trained ear as being higher than the other. (Observe, however, that it is not physiologically correct to speak of this as a case of a trained *ear*—the training is of all that part of the

nervous system which is concerned in the process of distinguishing differences of pitch or tone. A similar remark applies throughout the discussion whenever we speak of training a sense organ.)

Or again, take the training of the eye by mere contact with the environment. So inadequate is it that a man may never discover that he is colour blind. It is quite certain that training can do a great deal to improve the power of judging of shape, distance, and colour, which is only another way of saying that the training provided by the natural environment of the child is not sufficient to secure that the eye shall attain to the full measure of its efficiency.

It is easy to understand why the promiscuous training of the senses which the common experiences of life afford fails to give satisfactory results. Our senses are trained just so far as we use them, and we do not generally use them beyond the *average* needs of our daily life. For the child of a civilised race, those needs are restricted ; society guards him against the worst consequences of his deficiencies, so that there is little inducement for him to develop his senses beyond the lowest requirements of civilised life. Thus it results that most of us are but poorly equipped with means of observation—our sense organs are far below the standard for which nature designed them, because the training we give them is far below that by which nature designed to perfect them. For in nature's plan of education, the method is very drastic. Nature does not forgive mistakes ; her penalty for failure is

heavy, even to the extermination of the species which does not satisfy her demands. But her penalties are only for failure in that which is necessary; she loads us with no artificial lessons. Even the senses of the savage, which we rightly judge to be keen beyond ours, are keen only in regard to those details of his surroundings which are essential to his life. Of that which does not concern him, he takes but little notice —in regard to it, his senses are not well trained, and hence they are, in many respects, not to be compared with those of civilised races. Take one example only, that of draughts. There are society ladies and city clerks who will detect the slightest draught at once; the nerves of the skin send instant warning of, and the nerve centres of the brain take instant cognisance of, movements of the air so slight that the savage would never notice them. The reason is plain. Nature visits unpleasant consequences—a chilly feeling, or a cold, on the delicate person who sits in a draught, but there is no such unpleasant effect on the hardy savage.

There is another advantage in providing definite sense training for children. It reveals deficiencies which without it, would constantly pass unnoticed as well by parents as by teachers. When a child's external appearance presents nothing unusual, we are all apt to take for granted that his functions are working normally. Thus defects are allowed to develop which might readily be removed by timely treatment. That this is a matter of great importance has been proved by careful examination of great

numbers of children. By testing the sense organs separately, unsuspected and serious deficiencies have been discovered in a large proportion of the children examined. And even if the medical inspection of schools serves the purpose of discovering defects, it will not be nearly so effective in rousing parents to remedy them. Unless they realise that the defect is a practical disadvantage, parents are apt to look on the doctor's report as of no real importance; he is paid to discover defects, so he makes an artificial standard of perfection; but they are practical people, and know better. They are more likely to approve remedial measures if they find that their children are behind other children in some test of skill, rather than in something discovered with a scientific instrument. Indeed, they often regard it as a reflection on themselves if their children are less skilful than their neighbours'. And what is true of the parents is true in a still greater degree of the children themselves. They will be keen to improve a power in which they fall below the common standard. Thus many defects will be permanently cured which, if left to develop, might result in a permanent inferiority for which subsequent medical treatment could only supply a palliative.

Another great advantage in such systematic training is that it would call the attention of the teacher to the existence of physical defects in a practical and effective way. It is a common-place of educational literature that children who suffer from unnoticed defects of the eye or ear or nose are often treated with

great though unintentional cruelty, often resulting in serious ill-health, by teachers who are unaware that it is the physical defect which puts the school work beyond their power. If the teacher knew the physical peculiarities of the child as well as she knows the mental peculiarities this would be avoided.

The reason for dwelling at this length on the necessity of definite sense training, if we would bring our sense organs to a high level of efficiency, is that parents and teachers so seldom realise that nature does not give us all the training that is necessary. "Children," they say, "are always using their senses, and using them, too, in just the very way they require them. What possible advantage can there be in deliberately teaching them what they have ample opportunities of learning without being taught at all?"[1] Reasonable though the argument appears, we have seen that it is founded on a misapprehension of the facts.

5. *The Need for Training of the Muscles*

We find a similar low standard in muscle-training. Most of us will naturally train our motor control just

[1] Even professors sometimes say it. In a recent address to teachers, the head of the Department of Education in one of our British Universities asks, "Do normally equipped children require special sense training? Is their sensory apparatus not sufficient for their needs?" and there he leaves the questions, evidently considering that no reasonable being could give the answer in the text. Another, also addressing teachers, declines to discuss the Montessori system of sense training on the ground, among others, that "the senses have been so ridden to death that we are all sick of them."

well enough to escape really unpleasant consequences from our misdeeds. The child who breaks a few cups is forgiven—accidents will happen, etc.,—it is only the child who breaks them frequently who is made to feel ill consequences, and thus is led to improve, and so it is throughout life.

We can readily detect imperfect muscular control—we call it clumsiness. It often seems difficult to improve it; and in that, and indeed in any case, our first duty is to see that the defect does not lie on the sensory side. If it does, then the attention should be directed, in the first place, to training the sensory organs; for, as we have seen, the motor side cannot work smoothly if the sensory side does not supply the necessary information.[1] It is only by direct examination of the sensory side that we can ascertain whether the defect lies chiefly with it; because we cannot, by merely looking at someone, discover what his sensations are. We are compelled to ask him

[1] No doubt it is impossible to train either side without also, to some degree at least, training the other side; for, as has been already pointed out, every sensation involves some motor adjustment, and every motor adjustment involves some sensation. But we may direct the attention to either side at our will, and the rule is that it is best to direct it first to the sensory side and then to the motor side; which is the common practice, as we see from the maxim Look before you leap. A man about to jump a stream looks carefully at it to estimate its width, as he would say—that is, he calls on the sensory side to supply all the information needed for the correct adjustment of the motor side. Thus the man who misjudges the energy needed for a jump must be trained on the sensory side—he must be made to look *carefully* before he jumps. Such practice gives the best hope of improvement.

what he feels, whereas we can see what he is *doing* perhaps even better than he can himself.

6. *Sense Training and Muscle Training are Brain Training*

Enough has been said to show that sense training and muscle training involve brain training. But the evidence justifies us in putting the argument much more strongly. It is almost certain that what we look on as sense training is not really a training of the organs of sense at all, except, indeed, in the early years of life, for there is strong reason to think that practice does not increase the delicacy of the nerve fibres, or the actual sensibility of the sense organs. In normal individuals, indeed, both these appear to be far in excess of the requirements of the brain. We might increase the efficiency of the brain (or more accurately of the central nervous system) much beyond its present limits, and it would still be unable to deal with the extraordinary complexity of the indications supplied by the sense organs, if the latter be in a normal condition.

An illustration may help to explain this. When an untrained eye looks at a bacteriological slide through a microscope, it appears a meaningless area of variegated colour—the eye is at first unable to recognise what the teacher tries to point out. After the appearance of the object has been recognised, progress is rapid, and after some practice the attention is at once caught by the bacteria—it would be impossible to

glance at the slide without the eye recognising them at once, unless, indeed, there were other nearly similar objects in the slide. Yet the eye itself is no more sensitive than it was before—it sends the same complex of messages as it did before—it is the brain which has been educated to sort out, combine, and interpret certain elements in the messages sent to it through the nerve fibres from the eye, elements which it had not at first separated from the innumerable multitude of other indications. If it were the reverse, if in the short period of bacteriological training the eye itself had become a more sensitive organ, we should expect it to be more sensitive in detecting other minute differences of shape and colour in the field of view—those, for instance, by which a hunter sees whether an animal has passed along a track. But no; the attainment of delicacy in that kind of observation requires quite a different kind of training—the eye must be practised in observing tracks, so that the brain becomes practised in separating out from the vast complex of messages sent by the eye those particular elements which correspond to the object for which we are now looking, and then combining them into an object which has *meaning* for us. A very striking instance of this power of sorting out what concerns us is seen in the well-known cases in which mothers, in a besieged town, sleep through the loudest cannonade, but wake up at the slightest sound made by a sick infant beside them.

Even the extraordinary delicacy of touch in the blind seems to be no exception to this rule. Tested

on equal terms—that is, in regard to those indications in the sense messages which they have had no special practice in sorting out, it is found that the blind are no more sensitive than normal individuals, from which we infer that their greater power of interpreting the nature of objects from touching them is not due to the greater sensitiveness of their finger-tips, but to their greater power of interpreting the messages received by the brain. The blind have had such varied practice that it is difficult to get any test in which they have no advantage. One such test is as follows :—A weight is placed on the finger and the subject of the experiment estimates it in his own mind as well as he can. A liquid or a very finely divided substance is imperceptibly added to it, and the subject has to say when he perceives that the weight has been increased. Compared in this way, the finger-tips of the blind are on the average slightly less sensitive than those of the normal person, which is probably due to their lower average of general nervous organisation.

Thus it appears that sense training—and the same may be said of muscle training—is really brain training; and though it is far from the highest type of brain training, it is subservient to it—there is the strongest reason to believe that a higher average of sense and muscle training in the earlier years would lead to a higher average of mental equipment in the later years, and it would undoubtedly lead to a higher average of industrial efficiency. Moreover, when we are developing the control over the muscles of the hand, we are certainly organising a part of the brain which, as we

have seen, is very closely related to our intellectual activities.

7. *Dangers of Muscle Training*

But muscular control must not be carried too far, otherwise it may be actually antagonistic to the kind of brain organisation we desire. Take, for instance, training in laying bricks. If it be practised until it is done as a matter of mere habit, so that the attention is no longer directed to seeing that each brick is properly laid, then it has ceased to promote educative brain organisation. If the pupil is to be a tradesman, it may be desirable that he shall attain to automatic perfection in bricklaying; but such automatism is useless except to the bricklayer. When once an operation is so automatically performed that attention is no longer required, we infer that the part of the nervous system involved has become so completely organised that it tends to pass from the control of the will and to become automatic. Thus it tends to defeat one of the principal objects of a general muscular training, as distinct from mere training in a particular muscular activity; for that of the first is to improve the general voluntary control over the muscular system, that of the second is to reduce the voluntary control to a minimum.[1]

[1] In extreme cases of habit the interference with voluntary control is very marked, as in the well-known instance of the pensioner who could not help dropping his dinner if, when he was carrying it, some mischievous urchin were to shout "Tenshun!"

There is another direction in which the muscular training given in the school may fail in improving the power of voluntary control. If the attention of the pupil is not focussed on what he is doing, the result may be a general habit of carelessness in muscular control. Hence it is of the utmost importance that the exercises, both for sense training and for muscle training, shall be so devised that they shall themselves hold the pupil's attention. Physiological investigations alone are not sufficient to guide us here, though, as we shall see, they may be of great assistance. Attention is known to us as a conscious state, and we must discuss it from the mental side. Thus we are logically led to discuss the spontaneity of the child, on which Dr. Montessori claims that she bases all her methods.

CHAPTER IV

SPONTANEITY

1. *Why do we need Education?*

Why is education needed at all? And if needed at all, why does not Mother Nature supply us with all that we require? Why is it that we alone of all the animal world cannot trust to our instincts? Or, to put it in a slightly different way, why is it that our education is a somewhat painful process, while that of, say, the young kitten, is an easy and pleasant one? Why is it that in our lives work and play are regarded as opposites, while in the kitten its work is its play and its play is its education? Watch it; see how it delights in learning the very actions which belong to the full-grown cat. There is nothing which pleases it so much as trying to catch in its teeth or with its claws a piece of paper, or, better still, a piece of fur about the size of a mouse, tied to a string and jerked about. Watch it as it hides, and, appearing quite unconscious of the presence of its foe, yet prepares itself for the deadly pounce. Every activity of after-life is practised in play—its play *is* its education. With the domesticated cat there is indeed something

resembling our methods. One may see the watchful mother chastening the unskilful kitten, but that is only in order that progress may be more rapid when to the joy of success is added the lower motive, so often predominant with the schoolboy—the dread of the result of failure.

Look at the same contrast from a slightly different point of view. While in creative intelligence man surpasses all the other animals, he appears far below them in regard to the use and misuse of his powers. Is there any one who has no natural tendency towards actions which injure him? Yet the natural instinctive tendency of the young animal, which is possessed of a nervous organisation lower than ours, is towards that which will help it to be successful in its after-life. In short, the boy tends to do that which is wrong; the animal, to do that which, for it, is right.

This contrast applies to all departments of action. Consider the most fundamental of all—the acts which promote physical well-being. Compare the tiger cub with the boy. For the first, no medicines are required; or if by chance they should be, the cub itself knows by instinct what grasses to eat—and moreover, eats them; it is natural to it to keep itself in health. But give the children the run of the pantry, and how lamentable will be the result! And when the mischief has happened, how much would the danger be increased by leaving the children to select their own medicines!

Or take the larger adjustments to life. Even in its play, the cub, like the kitten, wastes nothing—

all is a direct preparation for adult life. But the boy expends much of his energy on games which have no place in the business of his after-life.

At first we may be inclined to rest satisfied with a partial answer to the question thus raised—to say that it is on account of the greater complexity of human life that we need education, in our sense of the term—that, after all, the wild cat's actions can be instinctively adjusted, because they are so simple that they do not, in fact, require *thought*. But this is not the real distinction, for very complicated adjustments may be made without conscious thought. Look at the wonderful organisation of a beehive. There may be 40,000 to 80,000 creatures all living an organised life within it, each performing his own part with far less individual uncertainty, far less need of direction from a superior officer, than attends the performance of the duties in a military camp. There is no confusion; each working bee does its work well and carefully; no policeman is required to keep order among this crowded population. Even in the suffragette outrages on the drones there is no real disorder, there is merely a wholesale execution for the good of the community. And not the least remarkable feature is that all this complicated social mechanism is apparently carried on without anything which corresponds to sympathetic feelings.[1] All this is done without education, for education in our sense of the term is

[1] If two bees are working next each other, and one is killed or injured, then, as Lord Avebury tells us, the other bee takes no notice of its comrade, except to push it out of the way.

impossible with insects. An insect when in its pupa shape is wholly passive; it merely follows the laws of its own growth, as little influenced by the external world as a seed within a pod. When that process is completed it emerges from the pupa and, although it is immediately launched into an absolutely new world, it is quite ready to take its place, almost as efficiently as it ever will, in fulfilling the duties of life. Thus it seems impossible to doubt that the wisdom of bees is instinctive. Complicated as their life is, education, in our sense of the word, is not needed.

It may appear a sufficient answer to all this to say that it is because the bee's life is all a life of routine that instinct is a sufficient guide for it– that the bee goes on from day to day doing the same thing in the same way just like a machine, while we have to meet unusual combinations. But the objection is easily answered; for there is at least one thing in the bee's life which is not a part of its daily routine, a process which appears to us more wonderful than anything which we can attain by the utmost exercise of the powers education has given us. Every one knows how, before swarming, or if the queen bee of the hive be accidentally killed, the worker bees will take some of the ordinary eggs, put them in "royal" cells, and feed them with "royal" jelly, and thus turn what would have become an ordinary worker bee into a queen bee. This marvellous process, without parallel in intelligent life, is done by instinct and without conscious education. The worker bees who do it only live about nine months; when the hive first

swarms, not one of them has ever seen it done before. Moreover, it is of no personal advantage to them, its object is not their own preservation, but the preservation of the future generations; the worker bees would live as long and have far more honey to eat, if they went on without a queen.[1]

The case of ants is even more striking. Some of the South American ant-heaps rival London and New York in population, and judged by the number of tiers in their edifices, the sky-scrapers of New York sink into insignificance. Yet complicated administrative functions, such as sanitation, appear to be perfectly performed, and each individual of each species—and there are more varieties than in a beehive

[1] Something very similar to the making of a queen bee from a neuter egg takes place in the human body. Suppose a piece of skin is destroyed, the microscopic organisms which carry on the processes of life within us are not able to replace it with true skin, which seems curious, because day after day they are gradually replacing every particle of which the skin is composed. For some reason they seem unable to make a true skin without a substratum of the original pattern to build on. Accordingly they do something which they never do except to repair an injury—they make a false skin or scar. Similarly, if a tendon is ruptured they repair it with a bit of different material, which, like the false skin, is not quite as good as the original, but yet serves the purpose pretty well. This adaptation is as it were stored up in these microscopic organisms. For generations the parents of the injured man may never have ruptured a tendon, yet the very first time it occurs in the offspring, the process is performed without hesitation or mistake. This is in striking contrast to the ways of intelligent beings. Watch a carpenter making something he never made before, or a scientist devising a new experiment—he does it better the second time in other words, he learns by experience. These little organisms do by instinct what is far beyond even our intelligence to contrive.

—seems to find the completion of his own nature in the services he renders to the community. But though there appear to be no internal divisions of politics, there is state-craft, for these ant-cities are confederated into States, and make war and peace together.[1]

Instances of this kind, which could easily be multiplied, put it beyond doubt that our deficiencies as compared to the lower creation are not merely dependent on the greater complexity of our actions. We must find another explanation for the fact that man, though endowed with a far higher capacity of adjusting his actions to his own preservation and that of the race, is far more inclined to actions whose tendency is to injure his life, or to injure the race.

The principle of evolution explains this contrast between the efficiency of instinctive tendencies in

[1] Prof. Lloyd Morgan appears disposed to question this view. He suggested that if an intelligent ant were to watch the development of the human species, it would conclude that their adult activities were instinctive, as the youthful activities of the child would appear to have little or no relation to the activities of the adult. But surely Prof. Morgan writes here with less than his usual acumen. If it were really intelligent, that is exactly the fact which would show the ant that the activities of men were probably not instinctive. And if the ant, without being intelligent, were barely observant, he could hardly fail to see that the school activities of the child, the three R's at all events, were very intimately related to his adult activities.

While it appears tolerably certain that, with practice, ants do improve in the performance of their activities, it seems extremely improbable that they are capable of acquiring any new activity, that is, any activity which is not so instinctive as to be a very ready response to the appropriate stimulus.

the higher among the animals, and the frequency with which, in mankind, they prompt to injurious actions. For that blind response to environment which we call instinct is formed only after long ages of nature's drastic training,—a remorseless training in which the penalty for failure is extermination. Only that which for generation after generation has been a necessary condition of successful life can become an instinctive habit of the race. Nature does indeed produce very perfect results, but only at a terrible expense of life. Take a familiar case—that of the common sparrow. It nests three or four times in a year, and there are usually about five eggs each time. An easy calculation shows that even if half the offspring were to perish before maturity, each pair of sparrows would in ten years have more descendants than the entire population of the British Isles. And it is because those who are least adjusted to cope with their surroundings perish year by year, that the number of sparrows remains about the same from year to year.

But these instinctive adjustments take time. The old adage, "Like father, like son," does not hold in regard to the rapidly acquired characteristics of the parent. The shoemaker may so train his own body that every action may be instinctively performed,—he could do it all with his eyes shut,—but his son will not thereby grow up a shoemaker by instinct. It is only where the surroundings remain the same for long periods that an instinct can be created. Instincts cannot be formed when everything is in a state of

flux. If, when the germ of an instinct begins to appear, the tendency it represents ceases to be useful, then it disappears before it has attained any prominence. It is only so far as the surroundings do not change that the process of the elimination of the unfit, carried on from generation to generation, can produce those instinctive adjustments which are often so perfect that little or no education is needed.

For mankind, so far as it is progressive, the surroundings are always changing, because man himself changes them. And the rate of change is so rapid when compared with the period required for the slow growth of an instinct, that we cannot expect that our instinctive tendencies will suit the changed environment. The function of education is not only to produce in the individual those advantageous aptitudes which have not yet become instinctive in the race, it is also to repress disadvantageous instincts. For if instincts arise slowly in the race, it is none the less true that they take generations to die out from the race, and that the period of civilisation has been so short as compared with the earlier ages of human existence, that a number of our instinctive activities have to be modified or restrained rather than developed.

We can now give a fair answer to the question why education is needed. In the very early stages, indeed, it is not needed; the play of the infant is just as educative as that of the kitten. Watch an eight months' baby squirming along the floor; every feature, from the laughing eyes to the laughing mouth,

—every sound, from the low soft chortle of satisfaction to the wild scream of success,—all join to show how great is the pleasure of learning to walk. So it is with all the fundamental activities which are common to us and the savage. For them, education and play are synonymous terms. But all too soon a new stage is entered on. The period in which the child develops those earlier characteristics of savage life which still belong to civilisation is over; characteristics which civilised man has discarded begin to appear; those of civilised life, such as handwriting and other subjects of the school curriculum, do not spring into existence of themselves. Then, alas! the days of the early education,—the happy education of play, too often cease, because the natural activities are no longer regarded as helpful. The group of admiring aunts is replaced by the schoolmaster, and education is carried on by distasteful work rather than by happy play.

Here then is the contribution of biological history to the problem of original sin. Because the ages of uncivilised life have been long, the firmly formed instincts of uncivilised life still persist, so that we do by nature the things we ought not to do; and because the ages of civilisation have been short, and the changes in civilisation very rapid, therefore there has been no time to form instincts for it, such as the bee has for bee life, and we leave undone the things we ought to do. While in the young of the animal world—though not always in domesticated animals—enjoyment and utility go together, in children, pleasure and utility so often seemed opposed that a large part of the

conscious education which mankind was believed to require consisted of curbing the injurious tendencies. And if the facts of life, thus viewed, seemed to bear out the old belief of the parent and the schoolmaster, that education meant repression rather than growth, no less did they support the theological view, that the will of man was essentially evil,—that view which led even the tender-hearted John Wesley to preach that the parent's duty to his children required that he should "break their stubborn wills." Nor can we be surprised at this when we remember that, untrustworthy as our bodily wants appeared in indicating the path of physical health, they seemed even worse adapted to further the higher interests of moral and spiritual education. It is little wonder that, in the past, men who were ignorant of the biological significance of these apparent conflicts should have acted as though there were three different aims in education,—the moral and spiritual aim, the mental aim, and the physical aim, and that these three aims were, for the most part, contrary the one to the other. The work of all the modern reformers in education has been to combat this view, and to establish systems of education in which the three aims shall all be attained together, and with a minimum of interference with the pupil's freedom. None of them has grappled with the problem in so revolutionary a spirit as Dr. Montessori, because no one had previously applied the principle of education through spontaneity as intelligently as she has. To understand the method, we must study the relation of spontaneity to education very closely.

2. *Spontaneity and Instinct*

An instructive lesson on spontaneity is afforded by the contrast between a baby and a chick, as shown by very careful experiments made by a Mr. Spalding.[1] When the chicks were about to break the shell he broke it himself, and immediately put a hood over the face of the chicks, so that they could not by any possibility see anything. He allowed them to remain in this state of darkness for two or three days, at the end of which he placed them on a table, or a sheet of white paper, on which a few small dead insects had been placed; and then he took the hood off. Almost invariably they seemed a little stunned by the light, and remained motionless for several minutes. After a time, varying from two to fifteen minutes, they pecked at the insects, showing not merely an instinctive perception of distance, but an ability to judge and measure distance with something like infallible accuracy. They did not try to reach towards things beyond their reach, as babies do. Almost invariably they hit upon the object struck at; they never missed by the fiftieth of an inch. For instance, a chicken that had been hooded for three days, remained still for six minutes after the hood was taken off. At the end of that time it followed the movements of a fly twelve inches distant. After four minutes more it

[1] *Macmillan's Mag. inc.* February 1873. Some other observers, experimenting on other chicks, did not get quite as remarkable results as Mr. Spalding's chicks gave; the instinctive adjustments required some little practice before they became as perfect.

made a peck at its own toe, and the next instant it made a vigorous dart at a fly which had come within reach of its beak, and caught and swallowed it. For seven minutes more it kept calling and looking about it, when a hive bee came sufficiently near, and was seized at the first dart, and thrown some distance away, much disabled. After twenty minutes it was placed on rough ground in sight of a hen with a brood of chickens of its own age. It started off towards the hen; it leaped over the smaller obstacles that lay in its path and ran round the larger ones, reaching the mother in as straight a line as the nature of the ground allowed.

Thus the chick does at once what it takes the baby several years to learn. But that is not all. To say that in the child the art of balancing, for example, is obtained slowly while in the chick it appears almost fully developed, is to omit one of the most significant elements in the contrast. For it is not so much that the child learns to *make* the proper movements, as that it learns to *avoid* the improper ones; in other words, in the chick there is no redundancy of action, while the child's actions abound in redundancy. Let us admire the chick! How perfect is its organisation, compared to that of the baby! What a complicated system it must possess! For what we speak of as the art of balancing is really the continuous adjustment of most complicated muscular actions. We recognise this in the familiar case of learning to ride a bicycle. We make many false, that is, redundant movements, because our nerve centres do not know

what to do. Only after long practice, when we have eliminated the redundant movements and the others have become habitual, do we find that it is really quite easy.

Yet the superiority of the infant chick is the proof and badge of the inferiority of the hen, and in the helplessness of the baby we find the certain sign of its adult superiority. In the chick, as we have seen, there are many purposeful and few or no purposeless actions; in the baby there are few purposeful actions and very many purposeless ones. In other words, the chick has little or no spontaneity, while the baby is full of spontaneity. By the spontaneous action of the baby, is meant action which is not part of a definite series, operating always in a definite order. Hence its purposeless or spontaneous actions are those which indicate the existence of a number of nerve centres which as yet operate in no fixed manner. This fact is of paramount significance, for on it the possibility of education depends. From the physiological point of view, education consists in the establishment of new connections between nerves and body. If there is no possibility of any nerve action except that which follows a definite routine, then education is impossible. If new activities are to be acquired, if there is to be real progress, there must be undeveloped nerve paths, that is, there must be spontaneity a distinguished from instinct. The difference between the two is easily described in physiological terms. Instinct depends on the fact that the nerve paths corresponding to the instinctive action are very thoroughly organised,

while purposeless spontaneity is due to a nerve discharge passing along nerve matter whose organisation is so incomplete that it is impossible to predict where it will pass, and what movements will result from it. Progress or education, looked at from the physiological point of view, means the organising, in proper directions, of unorganised nervous matter, or, as perhaps we ought to say, it consists in increasing the organisation of incompletely organised nervous matter.

Look at the bee. "How doth the little busy bee improve each shining hour!" As Dr. Woods Hutchinson [1] says, our elders taught us to say this as our tribute of praise; and we did so, let us hope, with a kind of dim feeling that there was something wrong about it. So there is. If a biologist were to be told this one fact about some otherwise unknown creature, he would at once say: "Well, your animal has its good points, no doubt; but I'll tell you one thing about it;—you can't educate it; it is practically incapable of progress." Progress implies change; it is opposed to instinct, which is fixed. What the bee does, it does by instinct. There is no semblance of freedom about it. Because there are no varying directions in which its energy tends spontaneously to exhaust itself, therefore it cannot be educated. No method of creating tendencies has been yet discovered. All that the educator can do is to take advantage of some spontaneous tendency, and to cultivate it,

[1] *Contemporary Review*, September 1903. A lively and suggestive article on the function of play in education.

making it the basis of the new activity. Therefore to say that the bee wastes no time in idle play, is to say that it has no other tendencies than those which relate to the work of its everyday life,—no spontaneous tendencies by which it can be educated to act as anything but a working bee. If all its tendencies are towards its work, then it will be a hopeless task to divert it from its work.

We see the same thing with mankind in old age. Old age is, indeed, often spoken of as a second childhood; but the most important of all the characteristics of childhood is absent—there is no real play—no spontaneous energy seeking expression in a thousand varying impulses. The mind works in fixed grooves, and therefore, in the childhood of old age, education is impossible. In fact, in every organism the possibility of progressive improvement in the individual involves the possibility of change in either direction, that is, of retrogression as well as of improvement. If man is to be able to rise above his normal standard, it is a physiological necessity that he must also be able to fall below it. Spontaneity or freedom has its dangers as well as its advantages. It is the duty of the teacher, as of the parent, to secure that the environment of the pupil shall make for progress, not for retrogression.

3 *Spontaneity and Culture Epochs*

In the preceding section we have opposed spontaneity to instinct. We have seen that the purposeless or spontaneous impulses of the baby are all-important

for its education; that without them, education is impossible. But as the baby grows into the child, the number of its purposeless movements rapidly decreases. The purposeless spontaneity of the baby changes with advancing years into the playfulness of the little one and the play of the boy or girl. Spontaneity ceases to be purposeless, it finds expression in purposeful play. And even play does not seem to be altogether *spontaneous*, if by that we mean dependent on the individual, for it moves along lines which, on the whole, follow a fairly definite order. There is a remarkable if somewhat uncertain correspondence between the progress of human civilisation and the order in which the successive play instincts make their appearance in the individual. The various phases through which the child passes seem to bear with them a faint echo of the history of the race—indeed the more strenuous supporters of the Culture Epoch theory, as it is commonly called, would never admit that the echo was faint. The idea that the life of the child is a kind of recapitulation of the history of the race, was suggested in the literature of the eighteenth century, but it was not till the nineteenth that it became a recognised theory. Great names are associated with it; among them are Goethe, Hegel, Comte, and Spencer. That it has a very important bearing on education is evident; the only question is whether it is to be regarded as affording suggestions to be investigated, or rules to be followed. Some writers express the latter view far more positively than the evidence appears to warrant. Thus Herbert

Spencer holds that the education of the child must reproduce in miniature the history of civilisation. Dr. Montessori lays down the same rule in almost similar terms (*The Montessori Method*, p. 160, last two paragraphs). In the opinion of the writer this is an exaggeration, but it is certain that all who have to do with children should know the outlines of the theory and be ready to act on its suggestions. To those who desire to apply the Montessori principles, this is especially important.

Even those who are least inclined to admit that the baby has any of the peculiar characteristics of the savage, cannot but admit that it shows no sign of the activities which are especially characteristic of civilisation. On the contrary, it will be found that it does resemble the savage in such instinctive activities or desires as it does exhibit; and the resemblance persists through the earlier years of childhood. We, indeed, usually put it the other way, and say that savages are like children. In their sudden temperamental changes, in their impulsiveness, in their lack of power to control present actions by taking thought for the future consequences, in their little vanities and egoisms no less than in their delight in strong contrasts and bright colours, the resemblance is unmistakable. And from the commencement of life there are more definite resemblances too, *e.g.* the baby's first mode of examining objects is by putting them in the mouth, just like the savage or the monkey,[1]

[1] A mischievous or playful child is often called "little monkey" by its mother. From the physiological point of view, however,

and later on we find echoes of the history of the gradual ascent of man in the various stages of the children's play.

Very early in the baby's conscious life comes the stage when safety is sought in concealment; and in the vigour with which the little one plays the game of peep-bo,—hiding behind any shelter, darting out as suddenly as he retired,—we see an indication of the strength of the impression left upon the race by the long ages of struggle between man and beast. No other of all the early play instincts is so permanent as this one. Not only has the writer known young people spontaneously recur to it even when almost grown up, but, in the modified form of hide-and-seek, it is the game which always gets the votes when, having tired themselves with games belonging to the

there is far more justification for the rarer use of the name as applied to the little baby. For the baby, unlike the child, still shares with the monkey a number of pre-human attributes, of which the most striking is the arrangement of the muscles which move the thumb. It is not until it is several months old that it acquires the human characteristic of being able to move the thumb laterally across the palm of the hand, or that it loses the prehensile character of the toes.

On the other hand, though in regard to its special aptitudes the baby has not yet wholly emerged from the pre-human condition, in certain of the larger characteristics which especially distinguish men from other animals,—viz. the size of the brain, the softness and hairlessness of the skin, and the smallness and comparative softness of the bones,—the baby seems as far in advance of the man as the man is of the monkey, a fact which seems to suggest the expectation of still further physiological advance in the race. But the advance, if advance there be, is extremely slow—there is certainly no evidence of any advance during the past two or three thousand years.

later stages of civilisation, the children say—"What shall we play now?" The earliest and most persistent of the play impulses belongs, as we should expect, to the earliest and most prolonged of the stages of prehistoric life—the stage of hunting and being hunted.

A little later, as increasing strength gives a greater sense of power, the child becomes the hunter rather than the hunted. A walk in the field, or even along the roadside, has delights into which we, alas! can no longer enter. Probably we can scarcely remember that we ever had such impulses. There are no doubt "grown ups" who, having forgotten their own childhood, have so little sympathy with the young people around them that they are never told of the prowling expeditions which healthy children enjoy so thoroughly, especially if they can get a lad or man to join them.[1]

[1] It would horrify some well-brought-up people did the writer tell them of the terrible and bloody excursions he had, now many years ago, with a rather delicate and very gentle little maiden of some seven or eight years of age. For the time being we were a big bear and a cub; and every now and then some roadside weeds or stones, perhaps, were perceived to be men walking with children. Then, after a stealthy advance, the foe was reached, and the big bear pounded the man, while the little cub smashed up the child, and blood and brains were scattered all around. And worse remains to be told. These prowls were taken before breakfast, and the bread and butter were enjoyed the more because they were eaten as the brains or the heart of the poor child who had been pounded up to make it tender eating. For two months this was a never-ending source of mental joy and of physical vigour, and without a trace of brutalising effect. Quite suddenly the phase passed off, and some years later the maiden, now sixteen years of age, and although stronger, not less gentle, is asked whether she recollects those

The stages of tribe life come later with the child, as doubtless they came later with the race. Organised games of warfare succeed, such as "Prisoners' Base," "French and English," "King of the Castle." In these games there are sides; there is usually a captain; and they are exciting and enjoyable just so far as they are realistic,—there must be captures and rescues and hair-breadth escapes. Sometimes, too, a number of boys will combine in gangs, and organise themselves on the model of Robin Hood and his merry men, and perhaps carry their mimic warfare too far for the comfort of the neighbourhood.

These later games have in them much of the "make-believe" element. No matter how fully the boy enters into them, he yet knows that they are but plays, and remote from the actual facts of everyday life. But the commercial instinct which manifests itself a little later than the war instinct, is much more of a reality. The marbles and odds and ends with which the schoolboy fills his pockets are very real possessions to him. Valueless as they are, he cannot lose them without far more than the passing regret with which he may lose a game. This is what we should expect. Activities which are no longer required must have less significance; they are felt to be less real. The activities which developed later in the

hunting walks at all? The answer at first is "No," but as the details are told they seem to rouse a very faint echo in the mind,—there is no true recollection, but only some sort of dim recognition that it may be true. Left to ourselves, all recollection of these earliest stages usually disappears completely.

race and are still essential to life appear later in the child, but they have more significance; there is less of make-believe than with those that are dying out.

Yet other instances of the immense impression made by the past activities of the race will be found in the childish delight in keeping domestic pets. Even the spoilt only child who does nothing for anybody else, and insists that every one shall attend to his or her wants, will delight in doing all kinds of things for its pet rabbit or bird — nay, will let no one else attend to it. Who can fail to see in this a survival from the long history of the domestication of animals? A process of such transcendent importance to mankind must leave its impression behind it. Equally suggestive of the past are the strange and solemn rites with which the dead pet is often buried. The doll instinct is even more fundamental, and it will be a bad day for the race if it weakens.[1]

These are only a few examples; any one can add others. For instance, it is a common observation that the old-fashioned and simple toys have a far more enduring hold on the affections of quite young children than the expensive mechanical toys, the novelties with which the shops are filled nowadays. They are a nine days' wonder; the older toys were a lasting delight. Should the motor car ever drive the

[1] The mechanical doll, which performs for the child when a spring is touched, does not fulfil the true purpose of the doll. It appeals to two different stages of mental development in the child, and does not develop the little mother in the child as it should.

horse out of existence, it is a safe prophecy that for long ages after that unhappy if convenient time, the primeval hobby-horse will still be a lasting joy, a sure testimony to the immense importance of the horse to mankind in the early history of the race.

Something of this history of evolution may be observed in the order in which juvenile literature is appreciated, but not at all so plainly. For such universal games as those described are the natural outcome of child development—their universality proves it; but in the taste for literature there is much that is artificial.

Nor are the evidences of our savage origin confined to children. It is no mere accident, nor due to selfish misuse of his position, that the professional man takes a long and complete holiday. Until a further period of civilisation shall have worked out the earlier element far more completely, it will always be true that he who uses in his daily occupation only those abstract powers of mind which have developed very late in the history of the race, will require to take a special period of recreation in order to re-create the fundamental physical powers common to us and the savage, which form, in fact, the physical foundation on which the higher powers of the mind have been established.[1] Therefore the man whose lifework is most remote from them is the man who

[1] The reference here is to what is known as the Biogenetic Law, as expressed in the formula, ontogenesis equals phylogenesis. It will be referred to later on.

finds it most necessary to revert to the earlier activities such as fishing or climbing. He expresses it to himself by saying that he needs a change. What is really necessary is that the higher mental functions shall find in his bodily system that supporting material by the aid and transformation of which, in the long course of history, these highest functions were evolved.

There have been several attempts to give a definite classification of these epochs, but the fact that there are several schemes is sufficient evidence of their hypothetical nature. In the present state of our knowledge, or perhaps it would be more candid to say, of our ignorance, we are not justified in attempting to draw hard-and-fast lines of demarcation. Indeed we are not even able to predict what echoes of the past would appear, and in what order, in a normal child and in a normal environment. Some of these stages may be skipped over by one child, others by another. The environment, too, may do much to suppress one stage or to encourage another. And notwithstanding Dr. Montessori's own adoption of the dictum that the education of the child should follow that of the race, it would even appear that under the guise of giving the fullest play to the child's spontaneous tendencies, the Montessori method itself has for its underlying principle the provision of an environment which shall be so unfavourable to certain of these spontaneous tendencies that they die a very unnatural death ; they are, as it were, smothered on their first appearance.

4. *What is Spontaneity?*

[The excuse for this section is that, repulsive though it be, it had to be written. Whether it has to be read or not is a matter for the reader, not for the author, whose responsibility ends with the writing. Those whose minds are of the critical type will perhaps read it; others, who belong to the assimilative type, will probably skip it.]

The words spontaneous and spontaneity have been used a good deal in the two preceding sections, but no proper explanation of their meaning has been given, except perhaps in connection with the purposeless spontaneity of the baby, which has been contrasted with the instinct of the chick. So far as the spontaneity of the growing child manifests itself in play, it has been shown in the last section that there is a good deal of ground for believing that play is not so spontaneous as we might suppose; that it is, in fact, due to inherited tendencies, and that it follows a more or less definite plan. Thus while the existence of purposeless spontaneity in the baby is evidently the basis of its capacity for education, the way in which the child's purposeful spontaneity is related to its education is not at all so clear.

If the conception of spontaneity did not play such an important part in the Montessori method, we might let any difficulties of this kind dissolve away gradually. But as it is, we are bound to make a careful, if tedious, examination of the whole position, and in especial, of the meaning we attach to *spontaneity*.

When we turn to the dictionary,[1] we find that spontaneity is

"that character of any action of any subject by virtue of which it takes place without being caused by anything distinguishable from the subject itself. Spontaneity does not imply the absence of a purpose or external end, but the absence of an external incitement or external efficient cause."

Further on we find that in biology it relates to activities which develop in the organism

"under no influence of external conditions or stimuli,"

and that it is

"the tendency to purposeless activity of the muscular system of animals, whereby they execute movements independent of external stimulus. Such actions, though voluntary, appear to lack recognisable motive, and appear to depend on the tension of a vigorous nervous system refreshed by repose. Such spontaneity is notable in the great activity of children and the gambols of young animals."

Without casting any aspersion on the dictionary maker, we must observe that these definitions are not satisfactory from the educationist's point of view. They do, indeed, exclude certain activities which we do not regard as spontaneous, *e.g.* actions dependent only on an external stimulus (perhaps the best example of such "mechanical" acts is that of a reflex movement), while, again, they include voluntary movements, which are among the most important instances of spontaneity. But between these extremes there are many intermediate groups, and it is just here,

[1] *Century Dictionary.*

where our real need of assistance begins, that the definitions fail us. In the case of an idiot, they include the loose and meaningless flappings of the hand. They also include those instinctive activities which do not depend for their exercise on an external stimulus, as well as various activities due to disorders, *e.g.* the optical activities which accompany *delirium tremens*, for the stimulus which gives rise to the nervous discharges causing these activities is internal, not external.[1]

For our purposes it is very confusing to include under one term such widely different activities as those we find in the dictionary. The fact is that short definitions of real things are unsatisfactory. If we interpret them logically, we almost always find that they are either too wide or too narrow. Phenomena pass from one class to another gradually, while logical definitions pass *per saltum*. In endeavouring to get a very short set of words which shall include all the cases we have in mind, we are almost certain to include others which we have not in mind. The definition, which is a short sentence, can never have the same meaning as the enumeration of all the individual cases it defines, which would require many long sentences. Thus we cannot truly understand de-

[1] Unless, indeed, we regard the circulation of the blood in the brain, or the matters it carries with it, as an " external " cause, which would probably compel us to attribute all brain action to an " external " cause. And if it be said that in *delirium tremens* there are certainly " external " matters in the shape of toxins in the blood, the answer is that the same thing occurs in many mental conditions, *e.g.* there is a toxin in the blood in anger, yet we do not class angry acts as non-spontaneous.

finitions of natural processes until we know the facts on which they are based,—and then the definition means for us far more than it expresses. Nevertheless a definition is often very useful; it is, in fact, an abbreviated note, the value of which is twofold. In the first place, it should serve as a nucleus, enabling us readily to recall our previous knowledge; and, in the second place, it should not only help, but compel us to analyse our conceptions and to sift out the essential similarities which are common to the different cases which we bring under the definition. In this case the analysis, if followed up, shows that the definitions are unreal—there is no activity of which we can be sure that it is wholly uninfluenced by external conditions or stimuli; nor any action of any subject of which we can assert that "it takes place without being caused," in part at least, "by something indistinguishable from the subject."

For the educationist, the more scientific standpoint is to consider that in the activities of an organism there are two factors—the organism and the environment, and that the peculiar character of an organism, as distinguished from lifeless matter, is that its reactions to stimuli, whether internal or external, are, under normal conditions, such as to make for the subsequent well-being of the organism itself or of its species. Of the nature of the physiological process by which this is done, we have not the slightest idea, nor is there any analogy in the physical world which could assist us. It is this property of the organism that enables it to adjust itself to an environment, so as to

react to it more successfully than before. If it seems to imply something like *choice*, it certainly does not imply *conscious* choice, nor even consciousness, since it is just as essential a property of plants as of animals. On it depends what is, for educationists, the spontaneity of the organism. Observe, however, that we do not class as spontaneous all the adjustments by which the organism responds to stimuli. When the response is fixed and unvarying in character, either because it is instinctive or because it has become so habitual as to be inevitable, then we look on it as "mechanical" rather than spontaneous. This is doubtless because in that case the organism seems to have lost its peculiar power of modifying its response so that it shall make for the well-being of itself or its species. We keep the word "spontaneous" for those uncertain responses whose character we cannot predict, because they depend on the non-mechanical element in the response, the element which baffles all our attempts to investigate the mode of its operation. Thus our conception of spontaneity, like all forms of thought which assume that phenomena do not follow ascertained laws, is to be regarded as essentially imperfect, because it depends on the limitations of our knowledge. What to-day we regard as spontaneous, because we can see nothing in the environment which renders the response inevitable, we may to-morrow cease to regard as spontaneous, because we may have discovered that it was the "mechanical" response to a stimulus of which we were not previously aware. Nay, we must

recognise that, with fuller knowledge, even the conception of spontaneity itself might have to be abandoned as no longer valid. Nevertheless, we must act on the best knowledge we have, no matter how imperfect it be, and we do not abandon either the conception or the word; we continue to use both, though we know they represent, not the complete facts, but our imperfect beliefs about them. It is only on special occasions like the present, when we are examining a theory of education which claims to be based on the conception of spontaneity, that we are compelled to examine our conception, so as to assure ourselves that we are relying on that which is valid in the conception, and not on that which is merely the outcome of our ignorance.

If the foregoing analysis of what the educationist means by spontaneity be correct, it is a mere truism to say that education must be based on spontaneity. For as the purpose of all education is to modify the responses which the organism makes to stimuli, only that can be educated which *is* modifiable, and, according to our explanation, that which is modifiable has in it an element of spontaneity.

Or, again, we may put it thus: —When we can predict what the response to a stimulus will be, and will remain, it is not a case for education; it is a case of education being either ineffective or unnecessary— ineffective, if the response, although undesirable, is so fixed that it cannot be altered by any efforts on our part; unnecessary, if the response is desirable. Indeed the latter case, if it relates to education at all, is a

case for examination, not for teaching. So long, for instance, as the response to the stimulus supplied by the question, "How many are two and two?" is uncertain, we teach; when the invariable response is "Four," we cease to teach it. Examination furnishes the test whether the response is sufficiently fixed to dispense with further teaching.

The discussion has been long and tedious. It will not have been futile if it serves to show how little we advance a problem by discussions about words. Its real use is negative, not positive; it should prevent our running away with the idea that we have laid down some great principle when we announce that education must be based on the spontaneity of the pupil. Until we know the details included under the statement, it is merely a verbal proposition. That is what the discussion brings out. Except for one or two physiological facts which are mentioned in the discussion, the positive conclusion amounts to little more than the statement that education is concerned with what is educable. Its especial purpose here is to serve as a warning to those who read Dr. Montessori's book, that they are not to think that they have grasped the principles on which her technique is really founded, because they have convinced themselves that education ought to be based on what they are easily content to call spontaneity. Until we have filled in the details, statements of this kind do not advance us one iota; for all methods of education are equally based on spontaneity, if we take that word in its educational meaning. Nor are we any better off

if we say that education must be based on freedom, because all education involves subjecting the pupil to an environment, so that no system of education can permit complete freedom to the pupil,—the very conception of complete freedom is an impossible one, for all environments affect or control the pupil's action, and there must always be an environment. But when we do know what the details are, then such statements may be full of meaning for us. To fill the details in is our next task.

5. *Spontaneity and Education*

The step next to be taken is to examine how education and spontaneity are related in practice—to outline in a very general way the details which alone give meaning to the proposition that education must be based on spontaneity.

We can find an illustration of the statement even in the case of the chick, referred to in a preceding chapter. For, perfect though its adjustments apparently were, it yet required education so as to enable it to discriminate between what to peck at and what to leave alone; and this education was supplied through its spontaneous tendency to avoid unpleasant sensations. It is through that tendency that it "learns" not to repeat undesirable actions;—having once pecked at a bee and rejected it, it will not peck at a bee again. It is only because the range of the chick's spontaneous tendencies is exceedingly small that we cannot educate it in the ordinary sense.

The child has a far larger range of spontaneous tendencies than the young of any other animal. Some of these are so fundamental that their origin goes back far beyond the race history of mankind; others are much more recent, they belong to the era of civilisation. The two most fundamental tendencies which are common to all organisms are the tendency to repel or avoid hurtful experiences, and the tendency to attract and repeat pleasurable ones. Intimately connected with the first are the tendencies to resentment, anger, and hate; and with the second, the tendencies to gratitude, sympathy, and love.

Less fundamental than these is the tendency to imitation, which we appear to share with the higher animals only. It is, indeed, not uncommonly said that monkeys, parrots, and a few other talking birds are the only animals which imitate, though sometimes dogs are added to the list, as by Professor Stout.[1] This only means that monkeys, some kinds of birds, and perhaps dogs, are the only animals which imitate man. But further evidence has been adduced to show that dogs and cats do not imitate their own species. It is pretty well established that a cat or a dog trying to get out of a cage does not imitate another cat or dog which gets out of the cage before its eyes. These, however, are very artificial activities, and it is quite erroneous to conclude from such experiments that young animals do not imitate their parents or guardians in activities which are natural to the species. It

[1] "Dogs often imitate their masters" (Stout, *Manual of Psychology*, 1901, p. 282). The writer has never observed it.

appears certain, from the experience of Signor Ferrari (p. 96), that birds, like cats and dogs, cannot be got to learn tricks by imitation; yet it is well established that singing birds learn their song by imitation, for a singing bird put with foster parents of a different species learns their song, not that of its own species. It was evidently through imitation that the vast majority of the Kea parrots of New Zealand learned to kill sheep, biting through the fleece to eat the liver.[1] As, however, parrots are known to imitate men, the chief interest of this case lies in its analogy to the observation of an American psychologist, Berry,[2] quoted by Claparède in his *Experimental Pedagogy*, to the effect that cats which as kittens were brought up without seeing grown cats kill mice, do not kill them, but only play with them,—which is probably the explanation of the known fact that some domestic cats are quite useless as mousers. But though it seems very unlikely that the higher animals resemble insects in performing all their essential activities instinctively, and not by imitation, it is quite clear that their imitation is instinctive rather than

[1] This habit began by the parrots picking at the fleshy sides of skins hung up to dry. After a time some one or more parrots thought of getting to the other side of the fleece on the living sheep; and the speed with which this habit became common, and the way in which the young parrots took it up, compels us to look on it as a case of imitation.

[2] Berry, "An Experimental Study of Imitation in Cats," *Journal of Comp. Neurol.* xviii., 1908. No doubt if such a cat were hungry and irritated, it would quarrel with the mouse, draw blood and take to killing mice, just as the man-eating tiger takes to eating men.

conscious. Imitation in which we first watch what is done, then form an image of it, and then make our action follow our image, is probably far beyond them. This is the kind of imitation which is needed for getting out of a trap by observing another doing so.

Perhaps the tendency to solve puzzles is not sufficiently distinct from curiosity to rank separately, but it marks a higher stage of development.

These are the more general tendencies only—there are many special tendencies, some of which are instinctive, which it is quite unnecessary to enumerate, *e.g.* breathing, talking, laughing, crying, sneezing, and so on. In addition to these, there is what we look on as purposeless spontaneity, such as manifests itself in free movements and the many forms of spontaneity shown in the play of children.

Connected with every vigorous manifestation of these tendencies is what we call attention.[1] Its importance in education is so great that it would be scarcely an exaggeration to assert that the eternal problem for the teacher is how to secure the attention of the pupil. It is as important in the education of animals as in that of children. An example, given in Darwin's *Descent of Man*, affords an excellent illustration for the teacher. He tells of a man who trained monkeys to act in plays. He used to pay the Zoological Society £5 apiece for them, but offered to pay £10 for those he retained if he might have them on approbation for a few days. "Asked how he could possibly learn so soon whether a parti-

[1] In the baby it may hardly rise to attention.

cular monkey would turn out a good actor, he answered that it all depended on their power of attention. If when he was talking and explaining anything to a monkey its attention was easily distracted, as by a fly on the wall or other trifling object, the case was hopeless. If he tried by punishment to make an inattentive monkey act, it turned sulky. On the other hand, a monkey which attended to him could always be trained."

This was not the view of Signor Ferrari, whose success in training birds was so remarkable. In 1904, in response to an inquiry made by the writer, he replied as follows :

" I have no way of selecting birds to do any special performance, but have to find out, often after much patience and training, which is the most likely one for the object I have in view, although there may be two or three of the same species under the same training. But I venture to say that the birds that have failed in the before-mentioned, will nearly always take to some other trick, and I have no hesitation in saying that I can train any bird." [1] On the question of imitation in birds, his observation that his birds never learned tricks quicker by seeing other birds perform them has been already referred to.

Signor Ferrari's method of watching for the spontaneous tendencies is that of Dr. Montessori, as of all the best modern exponents of infant educa-

[1] Of course, this does not mean that he could train a bird of *any* species. His experience was, no doubt, restricted to birds which, having the play instinct, were capable of education.

tion. But it is not quite so easy to place the monkey trainer. At first we might be disposed to rank him with the teachers of ancient Egypt, whose maxim was—"A lad has a back, and he hears when we strike it." But the monkey didn't hear when the trainer struck his back; he turned sulky, whereas the lad would probably have given some response. Now this difference is worth examining into. The explanation appears to be that the monkey trainer failed because he desired to make the monkey do something it had at the moment no spontaneous impulse to do; and, as we may reasonably assume, he could not get the monkey to connect the punishment with his failure to do the desired acts. In other words, he was unable to utilise the monkey's spontaneous tendency to avoid punishment. With the boy it is different. If he has no direct spontaneous desire or tendency to learn, the teacher can create in him what may be called an indirect desire to do it, because he can, as it were, graft [1] this desire on the spontaneous desire to avoid punishment. If the grafting process is skilfully carried out, the result may be to create a new spontaneity: a boy who is forced into what he regards as

[1] All analogies misrepresent the facts in some particulars, and this analogy of "grafting" is no exception. But as it serves to express a conception which would otherwise involve circumlocution, it seems worth while to use it, and there is after all a good deal of analogy. The graft does not grow on its own root, but receives its nourishment and support from what it is grafted on; yet after a time the two become so closely united that the graft ceases to be a foreign body, and becomes part of the plant on whose stem it was grafted. Other analogies will be readily apparent.

the useless habit of washing his hands before meals will probably continue to do so, not only through the force of habit, but through a really spontaneous desire for it. He would feel uncomfortable if he omitted it.

But just as in plants so in education, the grafting process has its limitations. We cannot graft one tendency on another unless it be a tendency which is at least a possible one for the organism. In dogs we can graft many tendencies, called tricks, on the two fundamental spontaneities—avoiding what is hurtful, and seeking to repeat what is a source of satisfaction. But you could never, in this way, graft articulate speech on any spontaneity of a dog. There must, in fact, be what we may call a possibility of spontaneity in the tendency we would graft. You can only use rewards and punishments to teach a dog a "language" based on the sounds it can make spontaneously. Nor is that the only limitation. Just as in plants so in education, too great a dissimilarity may be fatal to grafting. A boy may be quite capable of a spontaneous love for his teacher, but it could never be grafted on the fear of punishment. This is so obvious that no teacher is likely to attempt it. But the Egyptian type of teacher attempts quite as impossible a process every time he endeavours, through the fear of punishment, to make a boy attend to and understand a reasoning process for which his mind is not yet sufficiently matured, to take only one of many examples. In this respect the boy is not at all so happily situated as the monkey; for as soon

as the monkey trainer found that he could not graft any performance at all on the monkey's fear of punishment, he ceased to punish. But the teacher, who knows he can graft some activities, does not lose heart so quickly, and therefore he keeps on punishing in cases where it is just as useless as it was with the monkey.

We may then roughly divide spontaneous tendencies into two classes. We may desire to do something for the mere doing of it; the sole motive is the immediate desire to exercise the activity; there is no mental representation of future satisfaction; no desire to stand well with another person; there is simply an inner tendency to action without any other stimulus than is afforded by the actual environment of the moment. This we may call *direct* or *primary* spontaneity.

On the other hand, we may desire to do something, not for the mere sake of doing it, but for some ulterior motive—*e.g.* one of these excluded in the first case. This we may call *indirect* or *secondary* spontaneity. So far as the teacher relies on indirect spontaneity, it is a case of education by grafting.

Using this nomenclature, it will appear that in regard to the education of senses and muscles, Dr. Montessori's object is to be guided as completely as possible by the direct or primary spontaneities; that the same is, for the most part, true in regard to intellectual activity; but that, in regard to the activities which relate to social conduct, she is guided, not by the child's primary spontaneities, but by her own conceptions of what is desirable conduct, and

that, in inculcating these conceptions upon the child, she relies chiefly on sympathetic encouragement, and on the child's spontaneous desire to please those who treat him kindly. But it would seem that she does not hesitate to employ whatever measure of "absolute rigour" may be required to suppress anti-social conduct in the case of normal children. In this she follows the practice of all good and sympathetic teachers, but she is far in advance of the majority in her insistence on the medical examination of refractory children, believing that, at that early age, moral defects are usually founded on physical infirmities.

6. *Higher and Lower Spontaneities*

The discussion in the preceding sections is necessary to an intelligent comprehension of Dr. Montessori's work, because, following Séguin, she bases her methods of education on the spontaneity or freedom of the child. If, indeed, she always relied on the direct spontaneity of the child, if she never used the grafting process, we might draw a sharp line of division between her method and that of the Egyptian type. But, as we shall see, she does use the grafting process—no teacher can do without it. And, as we have seen, the Egyptian teacher, so far at least as he succeeds, does so because he utilises the spontaneous tendencies of the child—no teacher can succeed at all except so far as he does so. How then are we to express the difference between the two types?

The truth is that the difference between the modern teacher and the old teacher, even that between Dr. Montessori and the Egyptian teacher, is not one of principle but of application. The new education is quite ready to graft one tendency on another, but it chooses its tendencies with much more care than the old. For one thing, it tries as far as possible only to graft tendencies when they are almost, if not quite, strong enough to develop of themselves. Hence it lays great stress on observing the child, so as to find out what the child's spontaneous tendencies are, in order that they may be utilised at the proper time. Then it usually casts about for some more fundamental tendency on which the new tendencies may be grafted and made permanent. (Here reinforced, or strengthened, is perhaps a better term than grafted.) Dr. Montessori is especially distinguished from other modern teachers by the extraordinary thoroughness with which she has applied the modern view, a thoroughness which is forced on those who, like Itard, Séguin, and their disciples, have to educate the idiot or deficient child.

It is not only that the two processes, the old and the modern, are different; the results are different, even when each process appears to attain the same end. Suppose, for example, that we desire to bring up a boy to be a professional stamp collector. Probably we could, in eight or nine cases out of every ten, succeed fairly well by grafting this activity on the fear of punishment or the hope of reward. No matter at what age the lad was taken in hand, a skilful teacher

might expect to make a fair success of it. But if we can catch the boy at the time the collecting impulse begins to show itself, we shall probably succeed far better and with much less trouble. It will only be necessary to encourage the tendency by affording it reasonable opportunities of satisfying itself—reasonable opportunity, not full opportunity, if by that we mean opportunity to acquire collections without effort. Human organisms in their early stages are above all *working* organisms, and we treasure that which has cost us an effort; we may be surfeited even with that which we desire, especially when we obtain it without effort. If the stamp-collecting tendency be wisely utilised, it is likely, in after-life, to become much more than a business; it will probably unite with higher interests than when the cruder method of grafting is employed, and the whole life will be on a higher intellectual level. Still, we cannot be sure that the results of the later method will in all cases be better than that of the earlier—with some pupils it may be that the Spartan training of earlier times would result in a more thorough grounding than even the best of the "softer" methods of to-day, and might produce a more permanent effect. Applied to classics, it is at any rate certain that, even if it may have spoiled many a promising scholar, the old method has at least turned out some very fine ones.

But whatever doubt there may be as to the effect on the actual knowledge of the pupil, there can be none as to the more civilising effect on character of the modern method. For it is of the very essence of

civilisation that the motives which we share with the animal and the savage shall become less and less the mainsprings of our action. In the course of civilisation, not only are new tendencies, new mainsprings of action, developed, but even the older or more fundamental ones are transformed. The desire of the animal or the savage to avoid immediate pain is transformed into the civilised man's desire to avoid long deferred pain. Nor is that all. The very nature of pain and pleasure is transformed; they acquire a moral and spiritual character incomprehensible to the savage. These new tendencies, or new motives, or new characteristics, whatever we like to call them, are of the very essence of civilisation. The education which fails to call them into being fails in the most essential of all the requirements of progress.

Thus there is a second aspect of the contrast between the modern and the old education. Not only does the modern education select with far more care the tendencies or activities which it proposes to reinforce or graft on other stronger tendencies, but it also selects with far more care the stronger tendencies on which the new ones are to be grafted. If we understand by the more fundamental activities those which developed earlier in the history of the race, then we may express the contrast thus—while the older education endeavoured to graft all other activities on the most fundamental ones, the later education endeavours to graft them on the less fundamental ones, meaning those which developed later in the history of the race. In times gone by, the generally recognised method was

to graft all other activities on the tendency to avoid violently hurtful experiences, which is perhaps the most fundamental of all. We read, for instance, in the ceremony of inception of a schoolmaster in the Renaissance period, that, the candidate being provided with a lively new cane, the Bedell of the school provided a "shrewde boy" on whom to whet the cane. If the caning was that of a master hand, the ceremony was satisfactorily concluded—at least to all but one of those concerned, and as he got a groat on that occasion, perhaps he was well satisfied too. Even still the candidate for a scholarship or a fellowship in Trinity College, Dublin, has to make a declaration that he was educated "*sub ferula* M. N.," his teacher. The modern method, on the other hand, endeavours to utilise the higher activities, the social instincts, and thus to give force and volume to tendencies which make for the higher heritages of the race. This is as it should be; but we must not forget that just as these tendencies belong to the later history of mankind, so they belong to the later stages of the pupil's life, and we meet with no response if we appeal to them in the earlier stages. For instance, while very young children, like dogs and savages, may be trained to avoid wrong acts by the dread of immediate punishment, it is only civilised man who is withheld by the mental representation of long deferred evil to himself or to others, whether it be physical pain or mental or moral suffering. It follows necessarily that with very young children, education should be confined to encouraging the spontaneous manifestations as they

develop, because at that age the only method of encouraging other activities would be by endeavouring to graft them on the lowest motives; and even that is scarcely likely to succeed because, just as with the monkey, it is difficult to establish a connection in the infant mind between the pleasure or pain and the reason for which the teacher gives it. Nor is this the only, or even the chief objection. It is injurious to use these early punishments at all. There is more than one reason for this. In the first place, physical pain is a hindrance to physical development, and in so far it is injurious. But there is a moral objection. It is only when punishment has moral significance for the child that it can be morally justifiable to inflict it. Before that stage, it may be necessary to use physical force as a means of deterring the child from some injurious action; but though this may be painful to the child, it is not to be confused with *punishment* proper. And after the child can recognise the moral significance of punishment, it is immoral to employ pain as a *mere* deterrent, and without any moral recognition on the child's part, because that would be to give unnecessary prominence to the lower part of his nature, and so far to place him on the same level as the savage or the animal. Observe, however, that this does not apply to pain resulting from a violation of mere physical laws, because the child should not recognise such pain as morally significant. It should be treated as impersonal, and should never be given the moral significance of punishment inflicted by a moral being. Nurses and others not infrequently

fall into error here. When a child knocks up against a table and hurts himself, the nurse will sometimes try to soothe him by slapping the table and saying, "Naughty table," and perhaps she encourages him to do the same. That is a disastrous way to treat the situation. It brings a non-moral accident into the sphere of morality, and in the worst possible way, because it excites the immoral sentiment of anger in the child, and encourages him to vent anger in a slap. It also dulls the point of the lesson the child should learn, namely, to avoid bumping against the table. All such pain should be treated as simple pain, conveying no other meaning than the natural warning to be more careful in future.[1]

Biologically, reward stands on an entirely different footing from punishment, so different that the two should never be classed under the single heading of "rewards and punishments." Psychologically they serve the same purpose as incentives—one may indeed be replaced by the other. But, physiologically, they are absolutely opposed—there is nothing in common between them; for while pain is a hindrance to growth, pleasure is an aid to it.[2] It is not only right, it is necessary to encourage and sympathise with the

[1] This is not exactly Spencer's view of punishment.

[2] It is not improbable that this statement is universally true when interpreted in its literal sense and with reference to immediate physiological effects only. With regard to its indirect effects, pain may be a most necessary element in the normal development of an organism, because it may be necessary to suppress that which is undesirable in itself, or which though not undesirable yet excludes a more desirable growth.

manifestations of all those among the spontaneous tendencies which are valuable for civilisation. It is right and necessary to increase in that way the pleasure which the child experiences from the spontaneous exercise of its natural tendencies. To do so is only to carry on the normal processes of nature. The loving delight of the mother in the simple acts of the child is part of the natural stimulus without which the child will not reach its full development. The higher tendencies of the child have not in themselves that force which ensures their own development; they require encouragement from the environment. If he be placed in a non-social environment, these higher tendencies will die for want of the stimulus which such an environment supplies. This has been proved in several authenticated instances of children of civilised parents who have grown up without a social environment, and the results are of great interest historically as well as physiologically, and, as will be presently seen, they have a direct bearing on the theory of spontaneous education, as advocated by Dr. Montessori.

7. *The Influence of Environment.*

Before the close of the eighteenth century, when Itard, by his attempts to educate the Wild Boy of Aveyron, laid the foundations on which Séguin and Montessori built, there had been, since 1544, at least ten recorded instances of wild children found in Europe, of whom two were girls. It does not appear

that it was found possible to *educate* any of these children. All that could be done was to tame them. Like the higher animals, they could understand a little of human speech, but could never speak themselves. We are not likely to have another European "Wild Boy," but within quite recent times the story of Romulus and Remus has been several times repeated in the North-west Provinces of India, where many little children were, and some still are, carried off by wolves. Most, no doubt, are devoured, but some, who must have been brought up by their foster-parents, have been found living with the wolves in their dens. Of these children several have been captured alive, usually after a terrible struggle; and of them, some were brought to Mission Stations. None of them ever learned to speak, or to take a *human* interest in life, nor, so far as the writer can ascertain, did any of them ever learn to *work*; in fact, considered as human beings, they never became even semi-normal. The best description the writer has found of any of these children is in *Jungle Life in India*, by the late Professor Valentine Ball, F.R.S., pp. 459 *et seq.* When employed in the Geological Survey of India, he saw an account of a wolf-child captured in 1872, and brought to the Sikandra C.M.S. Missionary Orphanage near Agra. Two years later, being in the neighbourhood he took the opportunity of visiting the Orphanage, on 3rd August 1874, in order to see it. It had died, but he found another wolf-child there, a lad of about fifteen years, named Sanichar, who was captured by some natives in a cave, with a wolf, at Balundshaher,

and sent on the 4th Feb. 1867 to the same Orphanage. For a considerable time he could not be tamed, or taught to walk erect; he persisted in eating like a carnivorous animal, and tore his clothing to shreds. (These peculiarities seem to have been common to all the wolf-boys.) He was kindly treated, and became docile and obedient. He learned to make sounds, and to express freely his anger or joy, but never uttered a word of speech. He sat on the ground, behaving just like a monkey. Of him Professor Ball gives the following account :—

" He presented an appearance not uncommonly seen in ordinary idiots. His forehead was low, his manner restless and fidgety. From time to time he grinned in a manner that was more simian than human, the effect of which was intensified by a nervous twitching of the lower jaw . . . he depends much more on the sense of smell than on that of taste for the identification of objects [in this he resembled animals rather than savages]. . . . Without constant supervision it is impossible to keep him to any work. He will, for instance, carry a basket while watched, but immediately drops it when left alone." His arms were extraordinarily short, only 19½ inches, due no doubt, as Professor Ball says, to his having gone on all fours, as all the wolf-boys are reported to have done when captured. For several months after capture he had been unable to maintain an upright position, and when at length he came to walk upright, it is said to have been with a very curious action, "like one wading through thick grass, and at the same time moving

with a series of jerks. His head also was continually in motion, turning rapidly from side to side, and his eyes glaring, as though he expected an attack from some unseen enemy." These peculiarities seem to have continued till his death in 1896.[1]

Some of the peculiarities observed by Professor Ball are well seen in the illustration opposite.[2] It is very unfortunate that no scientific examination seems to have been made of these Indian cases. Extremely interesting results might possibly have been obtained from observations by a trained psychologist whose knowledge of physiology was at least sufficient to indicate to him the directions in which to experiment; and especially from post-mortem examination of the nervous system, and even of the bones and muscles.

We cannot be sure whether the disastrous results of putting these young children in a wolf-environment were due to direct discouragement of the human elements in their spontaneities, or merely to want of encouragement for them. The foster-parents may have been angry when the child attempted to make human sounds, or they may have simply ignored them. Whichever be the true explanation, these children

[1] Regarding the other wolf-boy, who had died after about four months' captivity, Mr. Erhardt, the missionary in charge, told Professor Ball that he behaved like a wild animal, and would never remain with the other boys, but hid away in any dark corner. During the whole time he was in the Orphanage he uttered no sound save a melancholy whine like that made by young cubs. A strange bond of sympathy attached the two boys together, and the elder one first taught the younger to drink out of a cup.

[2] Reproduced from a photograph obtained through the courtesy of Mr. J. Barker Wells.

afford a striking illustration of the fact that even the strongest of all the higher spontaneous tendencies of the child will not develop at all unless it meets with a sufficiently favourable environment *at the right time*. The spontaneous impulse to talk did not develop into

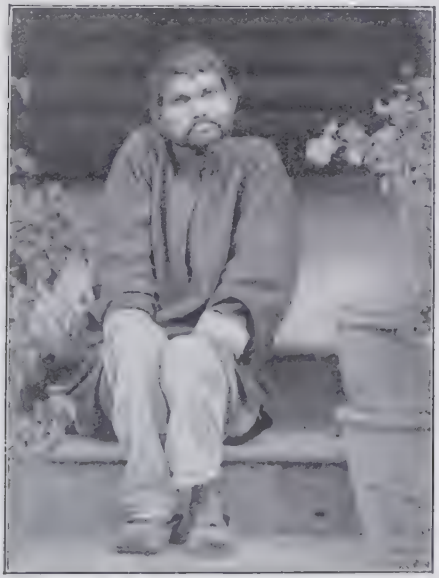

FIG. 1.—SANICHAR, THE WOLF-MAN.

speech in the unfavourable environment of these foster-children of the wolves; and when, about seven years of age (and sometimes earlier), they were put in an environment favourable for speech development, it was too late. The age is one at which it is easy for normal children to pick up a *new* language conver-

sationally. In them the region of the brain which deals with speech is still exceedingly plastic. The early spontaneity which prompted them to use the organs of speech was caught at the right time and rendered permanent. But with the foster-children of the wolves, these regions of the brain had ceased to be sufficiently plastic at that early age, and neither the plasticity nor the spontaneity was ever restored.

Of the two factors on which the child's mental and moral character depends, its own spontaneity and the nature of the environment, the latter is from one point of view the more important because it alone is under our control. The other factor, the nature of the child, is given to us at birth ; the environment provides the mental and moral food by which the spontaneous tendencies of the child must be nourished and developed, or arrested, as the case may be. But we must not press the analogy between the food of the mind and that of the body too far, because the selective influence of the mental environment has no parallel in the physical feeding of the body. The organism itself takes care that the nourishment shall be sent in the same proportions to the different parts of the body—we can do little or nothing to develop this or that organ by selecting this or that food ; if we starve some one element in the body, *e.g.* the bones, by giving insufficient lime, the whole body suffers. This is in striking contrast to the way in which the various spontaneities respond to the encouragement or discouragement of the environment. Even the wolf-children illustrate this, although at first sight it might be thought that all the

spontaneities had been starved together. But though this was true of the higher spontaneities, the lower spontaneities of self-defence and self-preservation were developed to an extraordinary extent. It was not until years of a civilised environment had discouraged these lower spontaneities that the wolf-man became the listless thing in the picture. Nevertheless there are many who consider that the environment is a very minor factor. They will admit some influence—that a favourable environment will allow the natural character to attain its full effective strength, while an unfavourable one may weaken it somewhat, yet they hold that what is called "character" will be practically unaffected. Yet even to the untrained eye, a mere inspection of the figure shows how overpowering may be the influence of an unfavourable environment. It is all a matter of degree, and although an exceptionally strong character may appear almost uninfluenced by minor modifications in the environment, this should not prevent our recognising that environment is always a great, and sometimes the paramount, factor in determining character. At all events as the entire difference between one method of education and another is a difference in environment, a study of any new method is really a study of the environment provided by the method. And in the Montessori method the "didactic material," as it is called, though an important element in the environment, is probably far from being as important as the human element, especially in regard to moral training. In reading Dr. Montessori's book it is easy to miss this point,

not only because she lays so much stress on the spontaneity of the child, but also because it is only through incidental glimpses that we become aware that her own personality is a paramount factor in the pupil's environment, a fact of which she herself is apparently unconscious.

Following the logical order of exposition, it would now seem appropriate to consider the principle of liberty on which, with the conceptions of spontaneity, Dr. Montessori claims to base her methods, and then to describe her apparatus and technique, beginning with the simplest stages—those in which the training of the pupil is most nearly on the perceptual level—and then to work up, in regular gradation, to the intellectual level. But we shall obtain a better general perspective view of the Montessori conception if we pass at once to the method of teaching writing and reading, in which the higher as well as the lower activities must be taught.

CHAPTER V

THE TEACHING OF WRITING AND READING

1. *Writing as a Means of Expression*

WRITING is not a mere mechanical art. It should be taught as a means of self-expression as well as a means of communicating with others.

An illustration may make this clearer. Suppose that a child, who knew no German, were taught to write in German characters, he could then copy any German work; and if he had also been taught the pronunciation, he could write German sentences from dictation, or he could learn by heart the sequence of German words in a poem and write it down from memory. In all these exercises he might acquire the greatest facility. In one sense such a child would have learned to write. But writing for him would be but a mechanical art; what he wrote would have no meaning for him. Such writing could never become, in the full sense, a means of self-expression. It might, indeed, express moods or feelings—even a careless observer would see that it varied with fatigue, with discontent, and so on. But it could never express thought. It would not be wholly mechanical,

—no organic activity ever is,—but it would be as nearly mechanical as a human activity can be.

The perfection of writing is twofold. Because it is used to transfer thought to others, it should be clear and legible. In regard to this the child of the last paragraph might excel. But he knows nothing of its higher functions. As a means of self-expression, its perfection consists in its spontaneously following the thought which it expresses. The fingers must indeed be directed by the nerves, and some portion of nervous energy must be spent on this; but it should not require an effort of attention, because the attention given to it must detract from the attention given to the thought it expresses. Thus, paradoxical though it may sound, the more mechanically perfect is the apparatus by which the physical movements of writing are performed, the less mechanical is the process of self-expression in writing. We may illustrate—the actions of speech have with most of us become so mechanically perfect that speech has become a spontaneous expression of thought. The thought and its utterance often seem to be simultaneous—we become conscious of the thought only when we hear ourselves expressing it. With the orator or the practised advocate, this seems not to be uncommon.

Dr. Montessori rightly lays great stress on this expressive aspect of writing. She gets the pupil over the mechanical difficulties of writing without his knowing that he is learning to write, and there she leaves him till, in a little while, he discovers for himself that he can write words or sentences, not by copying

them, or writing them from dictation, but because he has an inner impulse to express himself in that way. This sudden discovery by the pupil that he possesses a new power is a great intellectual stimulus to him. Thus writing becomes a pleasure instead of a task.

Perhaps the best analogy to this method of preliminary preparation is to be found in the modern mode of teaching to swim. Instead of putting the learner into the water, so that he has to learn the management of arms and legs, of breath and body, all at the same time, he is swung up in the proper position in a gymnasium, and first taught one movement, then another, and so on until it becomes easy for him to combine them all. Not until he has become expert in this, is he put into the water. The result is that he begins to swim quite easily, and without that terror of the water which so often prevents young people from learning to swim at all.[1]

Observe, too, that the process is much quicker, as well as much pleasanter. Because the separate movements can be practised separately, it is possible to devote the whole attention to one movement until it becomes almost automatic, and it is well known that this is the condition of quick learning and of good learning. This idea, that a combined movement was best learned by practising the separate movements

[1] This method of teaching a muscular activity by teaching separately the different components of the activity is often employed, *e.g.* in technical schools, in army drill, in gymnastic training, etc. Itard seems to have been the first to apply the principle from the physiological standpoint.

of which it was composed, lay at the root of some of the earlier methods of teaching to write. The pupil was taught to copy straight strokes, hooks and circles, one after the other, before he made letters. The idea was that when he had learned to do each of these easily and well, he could then readily combine them into letters. That is quite true, but the method gives no relief to the pupil, because the physiological processes involved in copying straight lines or hooks, are just about as complicated as those in copying a complete letter. The attention has always to be divided between the eye and the hand, just as in copying a complete letter, and the same set of nerves has to direct the same set of muscles whether the stroke is a straight line or a hook or a circle. It follows that the geometrical analysis of the shapes of the letters has no analogy to the physiological analysis of the muscular actions in swimming, since it is in the latter case alone that the complicated sets of actions involved are broken up into their separate muscular components.

In writing, therefore, the difficulty is somewhat different from that in swimming. No matter what letters we form, we employ just the same groups of muscles, and we are bound to educate them all at the same time ; we have no opportunity of educating them separately. Happily, however, this comes far more naturally to us than the simultaneous education of quite separate parts of the body such as the legs and the arms. For the legs and arms are moved by nerve centres situated in different parts of the brain, and it is found to be much harder to co-ordinate movements

which spring from different nerve centres than those which spring from the same nerve centre. In the ordinary method of learning to write the great difficulty is not so much in accustoming the fingers to make the movements of writing, as in the process by which we direct them to make those movements. It is the *copying* which is so difficult. To direct the movements of the hand by the will alone is one thing ; it is comparatively easy to move the fingers or the pencil now in this direction, now in that, just as we desire ; yet it is a long time before even this can be done with facility. But to copy a design presents far greater difficulties. First the eye has to study the design, so as to estimate the directions and distances along which the muscles of the hand must move the pencil. Then the eye is transferred to the pencil, so that the hand may be directed in accord with directions given by the eye, and this implies that the form of the outline must be remembered while the hand is drawing the copy. It is very difficult for the adult whose visual memory is trained—and who has learned to co-ordinate the hand and eye so well that he feels no difficulty in copying any outline more or less successfully—to realise what a strain these complicated processes put on the immature organism of the child. Indeed it is difficult for him to realise that there is any complication about it. It was just here that Dr. Montessori's study of deficient children was of such service to her. The processes of development which appear simultaneous in normal children must be passed through separately and very slowly in idiots or deficient children, so that the

observer has the separate existence and function of each stage of nervous development forced on his attention. For instance, Séguin had to spend a whole year in teaching an idiot to control the volitional movements of his hand before he could pass to the second stage, that of controlling the movements of the hand through the eye. The great advantage of the Montessori technique for teaching handwriting is that it practically avoids the need of teaching the co-ordination of hand and eye as a part of teaching writing. Children taught by her method could write nearly as well with their eyes shut as open. For instead of relying on the eye to direct the hand, she relies on what is called the *motor memory*. *The fingers are trained to remember the movements needed to form the letters.*

2. *The Motor Memory*

Physiologists and psychologists have for many years been well aware of the existence and importance of the motor memory. But although it is always in evidence, if we choose to look for it, few, even among professed educationists, have realised its great importance, and fewer still are aware how accurate it is. One of the best known of English educationists [1] recently wrote that " possibly if a person were to ' touch ' given objects for so many minutes each day, day after day and month after month, he might at last be able to draw a mouth or write an m." If any one desires to test this statement let him get a friend to cut out a letter,

[1] Miss Mason, in a letter to *The Times*, 3rd December 1912.

say about $2\frac{1}{2}$ inches high, from some alphabet he does not know. Let it be then placed on a table in a dark room, so that he can feel its shape with his finger. If he goes over it carefully several times with the finger for one or two minutes, he will find, on returning to the lighted room, that he can trace the shape quite easily with his finger. With some, no doubt, the time required may be longer, with others shorter, but it is very unlikely that any one will fail to get good results. The writer made an interesting quantitative experiment. A friend cut out an angle in thick blotting-paper, the legs being about 3 and $3\frac{1}{2}$ inches long, and laid it on a table in a darkened room. After feeling it for less than a minute and a half the writer returned, ran his finger up the edge of a piece of paper and then drew it off at what he felt to be the slant of the test angle. Watching where the finger went, a pencil line was roughly drawn, to mark its course. Then the finger was put to do its work again, but it constantly deviated somewhat from the original line and always by the same amount. It was evident that the first line had been badly drawn, and the necessary correction was made. The writer then measured the angle with the protractor which had been used to lay off the original angle. He reported it as 40°, and was told that this was the magnitude of the original angle. Next morning, at breakfast, it occurred to him to test his motor memory. He ran the finger up the edge of an envelope and then at an angle as before. A mark was then made and tested by repeated movements as before. The provisional mark was found to give an angle slightly greater than

the angle at which the finger naturally passed, but so little as to be not worth altering. The protractor gave it as 40½°, or half a degree too great. (Trying to copy the angle by the eye in the ordinary way gave a much worse result.)

Another interesting point was that the legs of the angle were cut of unequal length, and in the dark the difference in length was estimated as half an inch. Looking at the legs of the angle itself, it was estimated as fully three-quarters of an inch. Measurement showed it to be one-sixteenth over the half inch.[1]

[1] It would seem that there is an optical delusion here—that the fact that the legs form an angle interferes with the visual estimation of the difference of length. There are many such delusions, the following being one of the most effective :—Draw two vertical lines of equal length. At the ends of one place two arrow-heads, *i.e.* place a V upside down at the upper end and a V right way up at the lower end, so as to get a figure pointed at both ends. Reverse the process on the other, placing the V upright at its upper end and another V upside down at its lower end, thus getting a figure open at both ends. Take care that the straight parts of the lines are not altered in length. The double arrow looks the shorter. The lines may be placed side by side or in any position. If placed so as to form a cross, it is better to put the double arrow horizontally and the open-ended line vertically. (We have a natural tendency to exaggerate distances in a direction parallel to the length of the face as compared with those across the face. This is well seen by looking at a mountain range when lying down ; the mountains appear only a fraction of their height. Probably the explanation is to be found in the importance of being able to judge of the distances of objects—even when a man is standing on a hillock, there is hardly any vertical separation between an object five miles off and one double as far. Thus we learn to pay greater attention to the significance of the difference in position of the images of two points on the retina when these are in one direction than in the other.)

Teachers who practise their pupils on estimating distances or angles by the eye, should be aware of these possibilities.

3. *The Motor Memory in Writing*

The degree of accuracy of the motor memory must no doubt vary considerably in different individuals, and the above results are probably quite exceptional in their accuracy. But it is quite certain that the motor memory, especially of the hand, is a fundamental characteristic of the human organism, and one which has often been utilised both in drawing and in writing, so that the Montessori application to handwriting is not, as it turns out, a new one. At the time of Queen Victoria's Jubilee, one of the officers in charge of the Indian Reservations in Canada described the method by which the Indians in his charge copied the pictures of the Queen which he showed them. They ran the points of their knives many times round the outline of the head, so that on their return to their Lodges they might carve it out in wood. In far earlier times the method was known as the best means of teaching handwriting. Quintilian thus recommends its use: "As soon as the child shall have begun to trace the forms of the letters, it will not be improper that they should be cut for him, as exactly as possible, on a board, that his style [1] may be taken along them as along grooves, for he will then make no mistakes, as on wax (since he will be kept in by the edge on each side, and will be unable to stray beyond the boundary); and by following these sure traces rapidly and frequently, he will form his hand, and not require the assistance of a person to guide his hand with his own placed over it." [2]

[1] The iron pencil used for writing on waxen tablets.

[2] *Institutes of Oratory*, Bk. i. chap. i. sect. 27 (written *circ.* A.D. 90).

The Montessori method of teaching writing is practically a revival of the old Roman method, and it is a remarkable coincidence that its re-discovery should have been made by a Roman lady in teaching Roman children, in entire ignorance of the fact that it had been advocated in Rome nearly two thousand years earlier, by the greatest of ancient writers on education.

It is interesting, too, to observe that, unlike the invention of the method of teaching to swim, already described, Dr. Montessori arrived at it inductively, not deductively. There are no doubt hundreds of physiologists alive to-day, Dr. Montessori among them, who might have deduced it from their knowledge of the nervous system, but none did. This is recorded, not as a criticism directed against Dr. Montessori, or any of the physiologists who failed to follow up their knowledge to its practical application, but rather because it is well that we should realise how extraordinarily difficult it is to act up to the Greek maxim, "Follow the argument, wherever it leads." We have so little real independence of thought, we are so much the creatures of our customary thought, that it is rare indeed that we find any one who can fruitfully receive even a direct suggestion from the environment. It was because Dr. Montessori's mind was of this fruitful character that she was led, by a simple observation, to bring us back to the method practised in ancient Rome. It happened thus: she observed that an idiot girl who was possessed of normal strength and motor power in her hands, could not learn even the first step of darning, namely, passing the needle first under, then

over, the transverse threads. She thereupon set the girl to weave the Froebel mats, in which a strip of paper is similarly threaded under and over transverse strips of paper. When she had become skilled in this, it was found that she was quite able to learn darning.

Now there can be no doubt that what lay at the bottom of this was the well-known fact that idiots, like young children, cannot perform tasks requiring *fine* adjustments of muscles, because their nervous systems are not sufficiently organised to interpret the fine sensory impulses or to convey the fine motor impulses of the nerves required for fine movements. This matter is frequently overlooked even in many Kindergartens where it should be well known. Of course, it is true that because every part of the child is smaller than the corresponding part of the man, it cannot make such large movements as an adult can make—that would be a physical impossibility. But the contrast between the *nervous system* of the man and the nervous system of the child is all the other way. The trained adult can deal in very fine and finely divided nervous impulses; the child cannot. Even in adult life we cannot interpret or control finely divided nervous impulses of a new kind until we have had practice in them. Witness the process of learning to ride a bicycle. The learner's early attempts always fail because he compensates too much when he goes over to one side. So even in steering a boat or a motor car, he who takes the helm or the steering-wheel for the first time always steers too much. In the little child, however, it is

not merely that too much nervous energy is put into the movement; there is the added difficulty of interpreting the sensory impulses and of proportioning the nervous impulses properly among the separate nerves by which the different muscles are set in action—for there is no movement which does not require the co-operation of many different muscles, each with its due amount of tension. In the adult this is not felt as a difficulty, because his nervous system is far better developed than that of the child.

The inference from this is evident. To teach the child a new art, you must begin with movements which, for the child, are on a large scale. Thus he is better able to divide the nervous impulses along the different paths in just the proportions required to bring the muscles into harmonious action. When that is accomplished, he is somewhat in the position of the adult put for the first time to steer a motor car—he can do the required movements easily enough, but he does them on too large a scale. The next step is to reduce the scale, and that is easily attained with practice, because, for the most part, it means to reduce the intensity and duration of stimuli whose co-ordinations have been already acquired, rather than to acquire new co-ordinations of movements.

It is thus that we explain the fact that the idiot child could not learn to darn until she had learned to weave Froebel mats. No doubt there is a little added difficulty in using a needle instead of a paper strip, even independently of the size—the sharp point of the needle is annoying because it sticks in the wool, while

the paper strip is much more passive. But these are accidental difficulties only—the essential matter is that at first the work must be begun on a large scale.

While her practical work with children shows that Dr. Montessori was fully alive to the importance of commencing with large movements, it was fortunate that this particular case presented itself to her under a somewhat different aspect—"I saw," she writes, "that the necessary movements of the hand in sewing *had been prepared without* having the child sew. I thought I might in this way prepare for writing, and the idea interested me tremendously. I marvelled at its simplicity, and was annoyed that I had not *thought before* of the method. . . ." She then took the matter up at once; she had a writing alphabet manufactured, the letters being 8 centimetres high, with the larger ones in proportion; and the deficient children, who had already learned by touch to remember the shapes of geometrical figures—triangles, squares, circles, etc.—were now put to learn the letters of the alphabet by touching them all the way round, first with the index finger, and then, when skilled in that, with the index and middle finger, and finally with a stick held like a pencil.[1] As the child's fingers, when

[1] So far as regards this use of the stick, it will be seen that there is no essential difference in principle between this method and that of the copy-book in which some of the letters are dotted so that the pen may trace over the dotted lines, but in practice there is a great advantage in using the larger letters to guide the finger or the stick—partly because they *are* larger and therefore much better suited for the untrained muscles, and partly because the pupil can trace them over as often as he likes, while in the copy-books there are only a few letters outlined for him to trace over.

guided only by the eyes, were liable to slip off the pattern letter, she desired to substitute a furrow for the wooden letters. So it was that, after all these trials, she hit at last on the very method used in ancient Rome.

On account of the expense, Dr. Montessori had to abandon the idea of using grooved letters, and she substituted for them letters cut out of sandpaper and pasted on cardboard, the feel of which enabled the pupil to control the movement of the fingers without requiring any guidance by the eye. But when made in quantity, the grooved letters are comparatively cheap, and they control the movements of the finger as well as of the little piece of stick in exactly the right way. It will, however, be found advisable to commence with getting the pupil to move his finger along the groove. It is a smoother and easier motion than the other, especially when the pupil is blindfolded.

Whatever method be employed, there is one very necessary precaution. The pupil must be *taught* to move the finger or stick forward along the letter from its beginning to its end. Unless the letter itself supplies a control which makes it awkward for the finger to move along it in the wrong direction, the teacher must watch this very carefully at first, and not leave the child to touch the letter by himself until he has learned to make the motion in the direction in which it is made in actual writing. But when once the direction has been learned, the pupil will scarcely ever follow the wrong direction.

4. *How to "touch" Objects*

There is another precaution. Before letting the pupil feel round an object so as to discover and remember its shape, he should be taught to feel with a very gentle touch. Even apart from learning to write, it is a great advantage to have a gentle touch —it means muscular control of a very important kind. Clumsy hands and fingers which cannot moderate their force are very bad servants to any one—they have sins of commission—they cannot help breaking things—and of omission—they cannot make the fine movements which require skill. But beside this there is a purely pedagogical advantage in touching with an even gentle pressure when learning the shape of objects. For when we touch along a surface, there are two distinct sensations. We are conscious not only of the sensation of touch derived from the nerves at the finger, we are also conscious of the way we are moving the finger. This impression is, as we saw, derived from quite a different set of sensory nerves—the set whose special business it is to tell us how the various parts of our body are moving and what their momentary positions are. Put your hand behind your back and move it about; these are the nerves which enable you to tell without hesitation where it is and in what direction it is moving. It is from these sensations that the blind man gets his idea of space, and it is from them that the pupil is to get his motor memory of the shapes of the letters. It is therefore of great importance that the attention should be concentrated

on these sensations, and not on those of touch proper. But this requires that the sense of pressure at the finger tips shall not be sufficiently strong to divert the pupil's attention to itself. (If any one doubts the distracting effect of such efforts let him make the simple experiment of pressing his finger very hard against the table when he is engaged in some difficult problem.)

It is sometimes difficult to teach children to touch gently. As we shall see later, Dr. Montessori used the various grades of sandpaper, and of woven material, and practised the children until they were able to sort them out blindfold.

This preliminary training in gently feeling over a surface should be given by itself, and not in conjunction with the recognition of shape by touch, because in it we desire that the whole attention should be concentrated on acquiring the power to touch gently.

Were we to teach it as a part of teaching the shape of objects touched over, we should require the attention to be divided between two objects, with the result that more time would be required, and even then the objects in view would be less perfectly attained.

When the Montessori curriculum is being followed, the children do not pass at once from simple touching to learning the shapes of the letters, they learn to "touch" many different geometric figures first. When the method is applied to the teaching of writing in schools which do not follow the Montessori practice, it will generally be with older children who have already learned to read, and they may begin with touching

round the letters at once, no preliminary training being necessary for this.

While the pupil is learning the letters, he should also acquire some degree of skill in the manipulation of a pen, so that he will be able to make smooth strokes of even curvature when he begins to write. This is easily done. The pupil takes a piece of coloured chalk, or a pencil, and tries to cover the area of a square with it. At first the lines he draws are very irregular—some will pass beyond the bounding lines, others will not reach them. Soon the lines become more regular, and after a time the pupil can fill the square up with remarkably even and vertical lines. Then other figures are given to, or drawn by, the pupil, figures in which the lines are not all the same length—a triangle or an oval would do —and still greater facility is acquired, till in a comparatively short time the pupil can manipulate the pencil easily.

There are great advantages in this plan. The lines are drawn quickly and easily, not slowly and painfully, as in the copy-book method ; there is hardly any strain on the eye, because instead of having to watch minutely the correspondence of the movement of the pencil with the remembered copy of the letter, as already described, the eye is only called on to give the signal to the hand when the pencil has reached the end of its stroke ; and the practice gives just what is required, namely, facility in *rapid* movement of the pencil.

In the Montessori schools, as described by Dr. Montessori, it would seem that the final object is limited to

filling up the figures with vertical lines. This seems an unnecessary limitation. It would be well to get the children to fill up, with circular lines, the space between two concentric circles of different radii. (And, perhaps, between two concentric ovals also.)

As to the size of the figure to be covered with the chalk, it may be determined by the size of the letters which the pupil begins to write, because the shading of the figure should give practice in lines at least as long as the longest strokes the pupil will require. On the Montessori principles, however, the proper way to determine the size of the earlier figures to be shaded in is to give the little one a piece of chalk or pencil, and let him draw any lines he likes, entirely at his own free will. Then the first figures given him to fill in should require lines of about the length which the early attempts show to be easily and naturally drawn by the pupil.

5. *The Intellectual Element in Writing*

At the same time that the pupil is learning the shapes of the letters, he is taught their names, not the alphabetical names, but the sound values. Dr. Montessori's technique was as follows :

In order to emphasize the contrast between vowels and consonants, the vowels were cut out of yellow sandpaper mounted on dark cards, and the consonants of black emery paper mounted on light cards. The vowels were taught first, and according to the method of Séguin, two at a time, so that the contrast between the forms might impress the details the more firmly on

the mind. Suppose the two letters be *i* and *o*. The teacher says, "This is *i*," getting the pupil to touch it round with the finger, as already explained. Then, similarly, "This is *o*." The child may then repeat the touching as often as he likes, and when he has finished, the second stage is entered on. Here the teacher says, "Give me *i*," or "Give me *o*," or "Which is *i*?" etc. If the child does not know which is which by looking at them, she invites him to touch them round. If he still does not know, *the lesson is ended* for the day. THE ERROR IS NOT REVEALED TO THE CHILD. The lesson is merely repeated another day. Dr. Montessori regards this as absolutely essential if the teaching is to have the best results. It is to be remembered that these are very young children, and have always been taught in this way during their school life. It does not follow that a similar rule should be followed in teaching the letters to children who have been heretofore taught in the ordinary way, and corrected whenever they make a mistake. In fact, it would seem rational to conclude that in such a case a child might readily draw the inference that he was right, and proceed to imprint the wrong answer on his mind. With children always taught on Dr. Montessori's principles, this does not seem to occur. With them the lesson, given as she gives it, seems to dissolve out of the mind, and to leave no residue to interfere with the subsequent lesson. But although the experience of some kindergartens where the method has been adopted has shown that the same thing occurs with children of five, previously taught in the ordinary way, yet in such cases it must

only be adopted tentatively, and with due regard for the risk of confusing the pupil (see also p. 155).

If the child picks out the letters correctly, the lesson proceeds to the third stage. The teacher says, "What is this?" and the child should answer "*i*" or "*o*," as the case may be.

These three stages are called *The three periods of Séguin*, and the method is always applied in teaching nomenclature, *e.g.* the meaning of *rough* is taught with that of *smooth*, and in the three separate stages as here described.

In teaching the consonants, the sound value is first given by itself, and then it is joined with different vowels, and the process of the three periods is repeated.

As the pupil is now supposed to have acquired command over the pencil, and knows how to trace the shape of the letters, he could write any word if he knew how it was spelled; he could, for instance, write a "copy." But, as we have seen, it would be altogether contrary to the Montessori principles to allow this. The pupil must not write till writing has for him an inner meaning—till it becomes a means of self-expression. Hence the next step is not to write, but to compose words with the letters ready made. In the Montessori apparatus, a box is provided with four complete alphabets in the script or writing form in which the pupil has learned them. The letters are all sorted, so as to be easily found. As soon as the pupil knows some of the letters, the Italian teacher pronounces a word VERY distinctly a number of times. Next, she lays stress on the separate sounds. For example,

after repeating "ma ma" two or three times, she should bring out very distinctly the *m* sound in the first syllable, not now laying stress on the vowel. Then the child will generally pick out an *m* and place it on the table; next she should repeat the syllable, laying the stress on the vowel this time. The child will pick out an *a*. Then she repeats the word, so as to call attention to the fact that there are *two* syllables, and the child will repeat the syllables and thus compose the word "mama."

But it is one thing to compose, another to read what he has composed, and Dr. Montessori tells us that, as it generally seems to require some effort on the child's part, she helps him, urging him to "read, and reading the word with him once or twice"—a departure from the extreme form of the Montessori principle, which is worth noting in connection with some criticisms to be referred to later. But once the game has been started in that way, the child pursues it with great interest. The Italian teacher has only to pronounce any suitable word and the child will compose it. In English the teacher would have to begin with carefully selected words, just as is usually done in teaching to read by the phonetic method.

During this process the child's close attention is shown as well by his attitude as by the persistence with which, time after time, he repeats to himself the words he is composing, as is shown by the movements of his lips, especially when the word stands for an object with which he is familiar. The full meaning of his new power is only revealed to him when

other children read the word he has made. It is the revelation of a new means of communication, and his wonder is mixed with pride at his own achievement.

The pupil has now advanced a stage further. In addition to manipulating the pencil easily, and being able to trace the shapes of the letters, he can also compose words. Thus he is fully prepared in the mechanical part of writing: he can write any of the words he can compose. In a phonetic language like Italian, composing presents no difficulty, and so the writing of words and even of sentences comes to the children spontaneously. In English, which is not a sufficiently phonetic language, we cannot expect the sensationally brilliant results of the Italian schools, where little children of four and five years of age "explode" into writing anything that comes into their minds. To get such spontaneous writing from such young English children we should have to wait until they could spell the words they sought to express, and that might be undesirable on other grounds. Before considering this question, or the several points which the English teacher should keep in view, when using the guiding letters as an adjunct to the ordinary school methods, it will be well to summarise the results of the method at its best as it is described by Dr. Montessori herself—and it may be added that the description is accepted and confirmed by independent witnesses. It relates, of course, to children who have already acquired all the manual dexterities necessary to writing, and who have been taught the Italian spelling by the phonetic method.

On a bright winter's day when she and some of her children were on the roof, she happened to ask one of them to draw the chimney, putting in his hand a piece of chalk. Well pleased, he set to work, drawing with chalk on the tiles while she watched and praised; suddenly the child paused, thought a while, and then burst out, "I can write!" and forthwith wrote upon the tiles the word "hand," and immediately after "chimney" and "roof," exclaiming again and again, "I can write, I can write!" This brought up other children, who, looking on, were amazed at what their comrade had done, and soon others divined that they too possessed this power; and begging for chalk, they also began to write.

Thus, at the very first attempt, complete words were spontaneously written, *without any idea of copying some other writing*. As Dr. Montessori observes, it seemed to the children, not that they had been *taught* to write, but that they had *grown up into writing*; and to those who were not yet able to write, it seemed a thing that they were not yet old enough to do, just as a child knows that the elder ones can see over a wall which quite shuts out his own view. All the necessary movements and the ability to direct them had been made familiar and easy by the preparatory exercises, so that when the idea of writing once took possession of the child's mind the actual writing followed as if by miracle, and both teachers and children were filled with surprise and joy, the children excited beyond measure and not to be satisfied till the others had shared their joy and wonder. Indeed this alone

did not satisfy; they must be writing everywhere and all day long; nothing in the school afforded sufficient space for all the would-be scribes, and the mothers at home found even the bread written upon; and just as children refuse to be separated from a beloved toy, so one child went to sleep pencil in hand at night.

On this Dr. Montessori remarks that the actual writing had been too long delayed, causing a tumultuous ebullition of writing not entirely healthy or well ordered; she contrasts it with wise Nature's course in bringing a child very gradually to the use of language, since he begins to speak while his vocabulary is extremely small and the things he wants to express are few and simple, so that there is no sudden plunge into new expression; and she recommends that children be encouraged to write as soon as they are able (*a*) to fill in the outline figures with lines that are evenly spaced and parallel; (*b*) to name *some* of the letters by merely touching them round (*i.e.* without looking at them);[1] and (*c*) to compose words by putting the letters together. When a child is thus prepared, the mere fact of seeing his companions writing will probably be enough; most of the children write spontaneously when they have reached that stage. Children who do not write spontaneously within, say, about a week, should be directly encouraged to write —taught, as we should say.

When he has begun to write, the child's progress should be guided by ruling lines on the blackboard to

[1] This is evidently what is intended, though the word *some* is not given in the directions in *The Montessori Method*, p. 291.

keep the writing straight and the letters of even height, and by getting him to continue touching the letters, especially any that are not firm. Children sometimes do this of their own accord, bringing them up to the blackboard, and "touching" those that are wanted for their words before writing them. One child, for instance, if dissatisfied with any of his written letters, rubbed out what he had written, touched over again the sandpaper letter, and re-wrote it. Even for a year these preparatory exercises are recurred to by the children, who thus improve their writing without degrading their new faculty from its place as a form of expression, the highest form in the ascent of civilisation.

A month's work, playing with the preparatory exercises, usually brings a child of five to writing a complete word, younger children may require six weeks or seven. There was one child who could write after twenty days, using all the letters. Four year old children who have learned under her for less than three months are usually writing from dictation and ready for pen and ink writing in a notebook, and at the end of six months are equal in writing to the third class in the elementary schools.

Mr. E. G. A. Holmes, who was sent to Rome by the English Education Office to inspect the Montessori Schools, quite confirms this account of Dr. Montessori's results. Speaking of the application of the method to "ignorant and neglected children of the ages of six and seven" he says:

"Signora Galli-Saccenta, the able and diligent directress of the Girl's School of St. Angelo in Pescheria,

—a school in a poor and slummy neighbourhood,—having studied the Montessori system for two years, and convinced herself of its soundness, determined to introduce it, with a few minor modifications, into the lowest class of her school. That class, which in an English school of 15 years ago would have been known as Standard 0, is composed of girls of six or seven who were entirely ignorant when admitted. When I visited the school on 20th March, the system had been in force barely two months ; but it had already worked wonders. It was found that, for these older children, three weeks of sense-training were sufficient. When that period of preparation was over, writing, reading, and arithmetic were ' taught ' (if I may use that word) by the methods which have been already described. How far the girls had got in five weeks, the reader will judge for himself, when I tell him that one girl of seven, who had been a hopeless ignoramus when admitted, wrote in my presence, to her teacher's dictation, the following sentences, which, at the teacher's request, I selected—and wrote them in an excellent roundhand and without a single mistake : ' L'aqua è liquida ; il marmo è solido ; il gas è aeriforme.' ' La Rita è occupata ad aggomitolare una matasso di filo di cotone ' " (*Educational Pamphlets*, No. 24, p. 24).

This instance might lead the reader to think that the children naturally write *phrases* as soon as they begin to write. That may be so with older children. With younger ones, the writing of phrases is, as we shall presently see, quite a different stage from the writing of words.

6. *The Teaching of Reading*

The first part of the teaching of reading has been described already, that in which the child is taught to compose a word, and having composed it, to read it. Before describing the later stages, it is well to observe the contrast between the child's attitude towards reading and writing, especially in view of the general custom of teaching reading before writing.

The different stages of writing have come about spontaneously. The child has delighted in fingering the letters, and in using the coloured pencil ; he needed no urging.

Not so with reading. The child has no spontaneous tendency even to read the words he has himself composed—he generally succeeds only after an *effort*, and on the direct suggestion of the teacher, who " urges him to read, reading the word with him once or twice herself." Still more difficult is it to read words which others have written. Here again Dr. Montessori seems to violate her own principle of spontaneity ; in fact she *teaches* to read, just as any other good teacher might —very carefully, no doubt, and like every good teacher, with a great respect for the child's own activity, but none the less it is *teaching*, and based on the *directed* rather than on the *spontaneous* activity of the child.

It would appear that as soon as may be after the child has learned to write separate words, Dr. Montessori sits beside him with a number of cards, each containing some familiar word, *e.g.* the name of a well-known object, preferably a toy, which is, if possible, placed

with the card before the child, so as to suggest the word to him. Even then the pupil is generally silent a long time; he reads the component sounds as slowly as he would have written them. But this does not usually enable him to recognise the word, because for that the accent is required as well as the sequence of sounds. Recognition usually—but not always—comes when the component sounds are said one after the other so quickly that they are fused into one compound sound. Here as always Dr. Montessori shows herself as a true teacher. She does not now *say* the word, she waits while the child translates the written symbols into sounds, and, when the sounds are correctly reproduced, she limits herself to saying, "Faster, faster," till the meaning of the word bursts on the pupil's consciousness. "Then he looks upon it as if he recognised a friend, and assumes that air of satisfaction which so often radiates our little ones."

There are many teachers to whom it would feel unnatural to give the child sufficient time to discover the word for himself. Knowing the word so well themselves, it will seem to them that the mental work involved in passing from saying the sounds to recognising the word is so exceedingly slight that it is certainly not worth the time the child is spending at it, and they will say the word for him. Even teachers who are thoroughly convinced that the pupil must do his own mental work for himself may take that view. They would do well to consider the following example from school life. For one hour in the day, all the girls in a certain school had to speak in French only. During this

period one girl was heard to shout at another : " Vous vendez poisson chose," which being interpreted, is, " You sell fish thing." What did she mean ? Though the writer has told it many times, the only persons who translated it into the vernacular without serious difficulty were two German ladies who were more accustomed to translate sounds into English in a tentative way than we are. Somewhat similar difficulties arise with us when asked to pronounce a word which is spelled for us, as in the well-known example, bee-ay-see, kay-ay-see, aich-ee. In the translation of the French sentence the meaning will quickly dawn on those who have not yet seen it if they treat the central pair of words as one word, and put the accent on the first syllable.

We have seen that Dr. Montessori did not, in this matter of teaching to read, adhere to her own principles, and it is very interesting to observe the result. Italian being a phonetic language, the children so taught were able, at five years old, to read fairy tales aloud quite well, to the delight of their teachers, who were only too pleased that they should practise such reading. But Dr. Montessori was not ; she doubted whether the children's interest was a mental interest in the ideas, or what we may call a mechanical interest in the mere ability to read the sounds. An illustration may make this clearer. Some years ago Mr. David Salmon wrote (*Salmon's Art of Teaching*, 1900), " The best reading I ever heard was in a school where Robinson's Phonic Method was employed. [Robinson used a kind of compound phonetic alphabet.] Children of seven

could read fluently the leading articles in a newspaper just published," although, as Mr. Salmon says, they could not have any idea of the meaning of what they read. No doubt it is possible that in the hands of a skilful teacher the acquirement of such power in reading without understanding might be no harm, but as, in other hands, it is open to the most serious objection, it is instructive to see how a great teacher dealt with it. Dr. Montessori did not believe that the children could *understand* the fairy tales their admirers had presented to the school. She desired to test their understanding of what they read, and asked a teacher to tell one of the stories to the children while she observed how far they showed interest in it. To this end she forbade the teacher to ask a question, or to give an injunction in order to recall the attention of those who did not listen. The result was that the children, not caring to listen to what they did not understand, and being quite free to attend or not, just as they pleased, soon ceased to attend and returned to their own occupations.

Next she gave the book to a little boy, sat down beside him in friendly fashion, and asked him quite simply, as for her own information, if he had understood what he read. He answered "No," while his face seemed to ask the reason of her question. To him it had not occurred that the printed words could convey thoughts to the reader.[1]

It is a remarkable justification of the doctrine that

[1] To discover this idea was, she tells us, to be for her children "one of the most beautiful conquests of the future, a new source of surprise and joy."

education is best founded on the direct spontaneous activities of the child, that in regard to reading, where Dr. Montessori herself violated her own principles, the result was unintelligent learning—cram, in fact.

Dr. Montessori now took the direction of the children into her own hands, in order to revert again to her fundamental principle. She stopped the reading of the books and waited for some spontaneous manifestation from the children themselves. "Later on, during a 'free conversation period,' *four* children arose at the same time and, with expressions of joy on their faces, ran to the blackboard and wrote phrases." (One phrase was, "Oh! how glad we are our garden has begun to bloom," and the others were seen to be similar.)

Thereupon Dr. Montessori understood that, since they were able to write phrases, the time had come when they might proceed to the reading of phrases. She took the hint given by the children, and wrote on the blackboard "Do you love me?" The children read it silently as if thinking, and then shouted "Yes, yes." She next wrote "make the silence and watch me," referring to the game of being silent (Chap. VII.). The children not unnaturally shouted this out, but almost at once perceived their mistake. More sentences were written and read, and thus the peculiar function of writing was discovered by the pupils. They realised that they possessed a new means of conveying thought, and it had for them an intense interest. We may see the same thing when boy-scouts learn to signal. Two boys will play at sending the simplest of messages with delight; the feeling that you possess a new power

is the source of an emotion peculiar to itself; a very pure emotion, one altogether free from jealousy or envy, and indeed more, for it is an emotion the children desire to share with another.

A little later the character of the game was changed. The teachers wrote a number of sentences directing the children to do certain acts in a certain sequence. Among the examples which Dr. Montessori gives are the following: "Very politely ask eight of your companions to leave their chairs, and to form in double file in the centre of the room, then have them march forward and back on tiptoe, making no noise." "Ask three of your oldest companions who sing nicely, if they will please come into the centre of the room. Arrange them in a nice row, and sing with them a song that you have selected," etc. etc. In the game these slips are put in a basket; each child who can read takes a card to his seat and reads it silently once or twice. When they understand the directions, they return the cards to the teacher and set about carrying out the directions. Then the children commence their various tasks, each absorbed in what he had to do; as to the children who cannot read, they may easily be included in the tasks set on the cards, just as in the examples quoted.

Then, writes Dr. Montessori of the first time she played this game, "A great activity, a movement of a new sort, was born in the room. . . . It seemed as if some magic force had gone forth from me, stimulating an activity hitherto unknown. This magic was graphic language, the greatest conquest of civilisation." And

as she left that day the children gathered round her saying, "Thank you! Thank you! Thank you for the lesson!"

It is interesting to observe that the children read the first sentences to themselves silently though they shouted the answers. This was the spontaneous action of the children, and Dr. Montessori rightly concludes that reading, "if it is to teach the child to receive an idea, should be mental, not vocal." To read aloud with due expression and emphasis is an art but slowly learned. For to read aloud properly requires that we first understand the meaning. If, then, the adult prefers to read a piece mentally before he reads it vocally, does it not seem altogether unjustifiable to teach the child to read aloud the first time that he tries to get the sense of the passage? To do so is to make him carry on a double process, one which even the adult separates into two distinct processes, at least if he would do it as perfectly as he can. The result is that the child's attention is distracted between the two processes and each is badly done. Indeed, when the child is taught to read aloud in the first instance, instead of reading silently to himself, it is doubtful whether he is learning to get ideas from *written* language at all—he may gather the meaning from the sounds he hears himself making instead of from the seen words. This is a very serious defect in the ordinary method of learning to "read."

It is an interesting example of the fact that class teaching has its real and valuable place even in an atmosphere of perfect freedom, that we should find it used with such success by such an apostle of individu-

ality as Dr. Montessori herself, and there is no doubt that the class teacher could readily utilise much of what is most valuable in the foregoing. Many variations will suggest themselves. The writing of phrases on the blackboard need not be done by the teacher alone. Volunteers from the class might be called up to write any question on the blackboard, which the class reads and answers either *viva voce* or by written slips which might be read out by another of the class. All work of this kind has educational value far beyond the mere mechanical learning to read and write. It teaches the children to think about what they read, whereas any method which, like that referred to by Mr. Salmon, permits the children to read merely for the sake of reading the sounds correctly, is a direct encouragement to them to read, not only without understanding, but without even trying to understand. Taught thus, they become satisfied with the mere sound, they feel no further *want*. Being praised and encouraged because of their "good reading," mere parrot-reading though it be, it is no wonder that parrot-reading becomes to them an end in itself—that their spirit does not expand, seeking for some meaning to which they themselves respond, thus making it part of their own inner life of thought, and not a mere external accomplishment.

Of especial value is the game of writing long sentences containing directions to do several acts in a given sequence (p. 146). Children who can remember such messages without having to refer back to the paper slips not only educate their general

power of mental concentration, but acquire a habit of the utmost importance in after life. Who does not know how exceedingly difficult it is to ensure that a message shall be properly delivered or a direction properly carried out? It is impossible to over-estimate the value and efficiency of such training in promoting general intelligence.

It will be observed—and it is indeed a necessary corollary from the Montessori method—that, in it, reading is first taught from the script form, and that the reading of printed words comes later. This may be considered undesirable, or indeed impossible, in schools in which reading from printed books is insisted on before writing is permitted. But that need not prevent the teacher who places a high value on the self-activity and self-expression of his pupils from adopting or adapting methods similar to those adopted by the most consistent exponent of the doctrine of education by self-activity and self-expression that the world has yet produced. For example, it would be easy for the teacher of reading to write appropriate sentences on the blackboard, as already suggested, only using printed letters instead of script ones. Matters of this kind must, however, be left to the individual teacher. All that can be done here is to endeavour to explain the principles upon which all non-mechanical teaching of reading and writing must be based. To the native genius of the teacher belongs the task of applying those principles so as to conform to the limitations imposed by the curriculum, or, it may be, by his own views on the best method of education.

Although Dr. Montessori's technique in teaching the pupil to read is not novel, yet there are few teachers who realise as thoroughly as she does the immense importance of using the reading lesson, and indeed every lesson, as a lesson in articulation, including accent and pronunciation. We are apt to think that children learn to talk naturally. But if we observe ourselves, and those around us, both young and old, we shall see that we fall, most of us, far below the standard which can be and ought to be attained. Not only are there many positive defects of speech, there are also many negative defects, such as indistinct pronunciation. It is easy to prevent these defects by proper care when children are acquiring their vocabulary. But when once they have been engrafted by years of practice, it is often almost impossible to eradicate them.

It is therefore no small or unimportant part of the Montessori method that, developing every element of spoken and written language in detail as the child's powers develop, it trains him to use a well-spoken and well-written language as the natural and spontaneous expression of vivid and distinct impressions.

Besides this, as Dr. Montessori points out, the phonetic exercises through which she leads the child to read (and through which the child advances eagerly, as there is associated with each step the pleasure of a new discovery and of a new power) are just the very exercises by which those who endeavour to remedy defects of utterance or of speech in older pupils, try painfully to correct what need never have become a

habit, if, while speech was developing, the right movements had been prepared and the right sounds dictated. And though this involves a much better knowledge of the nature and mechanism of speech than is required from the ordinary teacher, yet care in early distinctness of articulation would do much to improve speech.

Nor is the importance of a clear pronunciation confined to the practical matter of clear speech. While no doubt there are exceptions, it may nevertheless be stated as a general rule that there is an intimate connection between clear articulation and clear thought. This belief, first formulated by practical teachers, is in entire accord with the teaching of psychology, so far as our knowledge extends. It was very clearly stated by a great teacher, Thring of Uppingham, who laid down that, if boys were to be taught to think clearly, they must be taught to pronounce distinctly, especially the last words and syllables of each sentence. Certainly the converse is true; the natural result of indistinct thinking is indistinct speech. If we have received through the senses some fleeting, half-understood impression,—a faint sound just heard for a moment, a brief glimpse of some vanishing light or trace of colour,—we naturally, almost inevitably, use a broken phrase, a half-uttered word, to describe our impression, the impression itself being undefined. When a boy mumbles his lesson, we may be pretty sure that his knowledge of it has not been brought into clear consciousness—unwilling to pull together his lurking memory and halting expression, he hopes by mumbling half an answer, to get his teacher to

supply the remainder or to take it as said. And, conversely, if he makes his words clear and distinct, it compels him to fix his attention on the words he uses, and thus, indirectly, on the ideas they convey. Certainly, in so far clear speaking calls for and is an aid to clear ideas.

7. *Application of the Method in Ordinary Schools*

The teacher who follows the full Montessori Method will find in the foregoing all the instruction that is required, so far as book instruction can suffice, but it can never adequately replace personal instruction or experience.

The Kindergarten teacher or the ordinary school teacher, whose unit in teaching is a group of pupils, not an individual, can readily incorporate the training of the motor memory as part of his or her educational process. If the principles already explained are understood, it should not be difficult to adapt them to ordinary class teaching, with little if any increase in the individual attention and supervision which is always necessary with the younger children, especially when commencing a new subject. A *résumé* of some of the precautions involved in the preceding explanations may, however, be useful.

In the first place, the importance of beginning with large movements must be fully recognised in the school practice. Beyond doubt, some part of Dr. Montessori's success in teaching writing is due to the fact that, like many other modern teachers, she gets her pupils to begin with very large letters—hers are about $2\frac{3}{4}$ inches high. The true rule with little children

is to begin with large movements in every activity and pass very gradually from them to smaller ones.

Another matter of great importance is to observe carefully that the pupils " touch " the letters properly —that is, lightly and evenly all round, and that they move the hand or stick in the proper direction. Mistakes in direction are perhaps more frequently made in " touching " *f* than any other letter, but care is required in all. This difficulty—a very serious one in class teaching—is readily avoided by using letters with a control to prevent the wrong direction being followed.

The next point to remember is the importance of not letting the child begin to write, or, at all events, not letting him continue writing, until the motor memory for the forms of the letters has been so well trained by practice in touching over the standard letters that the pupil *begins* his writing not only easily but tolerably well; and, as Dr. Montessori points out, this practice in touching the letters or in moving a dummy pen or stick in a groove should be continued for a long time, even while the child is so far advanced as to practise writing with a pen, because the object is not merely to write, but to write a good hand. The importance of beginning with *good* writing can hardly be overestimated, not only because of the great difficulty of getting rid of bad habits unconsciously acquired, but also for the general reason given on the next page. This is especially a case in which excellence in the art is to be acquired by practising the motor preparation separately, so that the attention can be entirely directed to it, rather than by letting the desire for

expression set the motor impulses in operation without such precautions as ensure that they are being accurately adjusted.

Dr. Montessori lays great stress on the importance of not allowing the child to write with badly formed letters; if he has any tendency to do so, he must be brought back to the exercises for touching the letters. "To go forward correcting his own mistakes, boldly attempting things which he does imperfectly, and of which he is as yet unworthy, dulls the sensitiveness of the child towards his own errors." There can be no doubt of Dr. Montessori's wisdom in this—nor of the unwisdom of allowing school children in more advanced schools to practise scribbling notes of lecture-lessons to the ruin of their handwriting. Writing quickly is a desirable accomplishment, but it should be carefully practised as an end in itself, *i.e.* when the attention is directed to the writing alone, with the object of securing that it is good as well as quick. Secondary schools are great offenders in this respect. To allow the pupil to begin writing as rapidly as possible when his attention is directed, not to the writing itself, but to what the teacher is saying, is almost certain to destroy that careful formation of the letters which has been insisted on in the earlier years. University examiners are well used to the extraordinarily bad handwriting of the secondary school pupils—bad in every way; for, not having devoted their attention to rapidity in writing, they commonly write neither rapidly nor legibly.

It might appear at first sight that it is inconsistent

to object to dulling the sensitiveness of the child to his errors, and at the same time to refuse to reveal his error to the child when, being asked for an *i* he gives an *o*, as on p. 133. Such a criticism would be unfounded. It is one thing to lead the child to be sensitive to his own errors, so that he may grow to have an inner desire for his own perfection; it is quite another thing to lead him to be sensitive towards other people's estimate of him, so that he desires less to do well than to be thought to have done well. No doubt it is possible to err in either direction, and in a matter like this teachers and parents must judge for themselves. But at least let them weigh the reasons which, as the writer believes, actuated Dr. Montessori in not allowing the teacher to correct the child in a mistake such as that on p. 133. Doubtless she would guard the pupil against (*a*) such a fear of reproof as would tend to prevent his confidently showing the teacher the spontaneous workings of his own mind, (*b*) such a diversion of his attitude towards the lesson as is involved in giving his attention to the teacher's estimate of his knowledge, instead of giving it spontaneously to the idea itself (for it is that which he ought to learn, and therefore ought to attend to), and (*c*) emotional feelings, whether of depression at being told he is wrong, or of an undue effort to please by remembering the lesson, or of undue excitement at having pleased or displeased the teacher.

It is proper here to refer to another precaution. It is dangerous to force a child who is naturally left-handed to write with the right hand. Evidence has been

accumulated which establishes the fact that this is a fertile cause of stammering. In one case a left-handed pupil, having begun to stammer while at school, was removed, and having dropped back into left-hand writing at home, the stammer ceased. After a time the parents desired to send her to school again. Fortunately the family doctor knew the stammer might be due to the writing, and as the rule of the school required that she should write with the right hand, he advised the parents to let this be tried at home before sending her back to school. This was done and the stammer recommenced.

Of course this instance is not given as proving a connection,—a single instance could never establish such a fact,—it is merely cited as a striking example. But the statistical evidence which has now been accumulated would be amply sufficient to establish some connection even were it not *a priori* very probable. The immediate cause of stammering is well known. It is that the nerve impulses to the various muscles which move the organs concerned in speech do not succeed each other in proper sequence. For instance, if the impulse to expel the breath through the vocal organs just follows instead of just precedes the impulse to the lips to close in order to make the sound of *p*, then a stutter results, and if the action is prolonged, we get the worst form of convulsive stammer. But this improper sequence is just what we might expect might result from trying to set up a new nerve centre for speech—it might interfere with the existing nerve centre. Now we know that the speech centre is one

side or the other of the brain, according as the right hand or the left hand is most used, and that, especially in children, a second speech centre may be set up on the unused side of the brain, if by any chance the original centre is destroyed. Hence we should naturally expect that if we made a left-handed boy employ his right hand, especially for matters connected with speech, the result might be to set up a second and imperfectly organised speech centre on the other side of the brain *pari passu* with the use of the right hand. If both worked well and in harmony, no harm would be done, it might be an advantage, especially in case one speech centre happened to become diseased in after life. For such a patient would suffer little or no inconvenience; he would naturally use the other centre, and perhaps be quite unaware of the difference. But where but one speech centre is used, its destruction is most serious, for in adult life the brain has lost so much of its plasticity that it seems doubtful whether the second speech centre has ever been established after middle age, and certainly there is no recorded instance of its having attained to any degree of flexibility.

It is evident that this bears on the question of teaching ambidexterity. Exactly how far the cases are parallel it is impossible to say. It is very probable that no ill-effects whatever might follow from an attempt, consciously made towards ambidexterity by the pupil, *and with his own goodwill.* As we do not know the sequence of cause and effect, we cannot speak dogmatically, but what we do know certainly indicates the need for great watchfulness, and if any tendency to

interfere with the smooth working of the organs of speech be suspected, the training for ambidexterity ought to be immediately discontinued. It is therefore incumbent on the teacher to be extremely cautious about teaching a left-handed boy or girl to "touch" the letters with his right hand.

In those schools in which reading has been taught before writing, the pupil will not require to be taught the names of the letters as he touches them over, for he will know them already. But where the order in which the subjects are to be taught is at the teacher's option, the physiological argument for teaching the letters in the first instance by touch, sight, and sound, all together, as in Dr. Montessori's technique, is overwhelming.

The teacher who works under an authority whose requirements are fully satisfied by the mere mechanical ability to write, will be under a great temptation to ignore the most important function of writing, namely, that it shall serve as a means of self-expression. Self-expression is the evidence that the child's spirit is active. So far as the child's thought and action is forced to correspond to the thought of the teacher, so far it has a passive element and has not produced its full formative effect on the child's mind. It is only when it becomes a spontaneous manifestation that we know that it has become part and parcel of the child's nature. It is seldom, indeed, that children who have not been unduly repressed fail to exhibit these spontaneous manifestations of their mental life. They have a natural tendency to express themselves

in any and all of the ways at their command. Hence if writing has been taught them without a distasteful sense of weary effort, they will in all probability use it as a means of self-expression, just as happened with Dr. Montessori's pupils. Teachers who disapprove very strongly of allowing pupils ever to write a word with incorrect spelling, and who therefore require that their writing shall be at first confined to copying what the teacher has written on the blackboard, will refuse to encourage their pupils to use writing as a means of self-expression in the early stages. In the author's opinion the disadvantages of this plan far outweigh its advantages, as compared with that advocated above, but if it is to be employed, the pupils should give their own phrases for the teacher to write.

Whatever be the demand of the paramount authority, the teacher ought never to lose sight of self-expression as the true goal of his teaching, and with that end in view he ought to take the greatest pains to secure that the words or sentences with which the children commence their writing relate to things or ideas with which they are thoroughly familiar, and which are among the pleasantest associations of their daily lives. It is one great advantage of the Montessori method that it does away with the need for copy-books, in which, from the nature of things, it is impossible that the headlines shall be in an intimate individual relation to the pupil's spontaneous interests. And even without the Montessori method of separate individual work, the class teacher can appeal to the

spontaneous interest of the class as a whole, which is often just as real an interest as that of the individual children who, under the Montessori method, are working separately, each at his self-appointed task. Class sympathy, under a skilful teacher, often becomes so strong that it creates a really spontaneous interest in each individual of the class. Even in Dr. Montessori's own teaching, where the ideal consciously sought after was that each pupil should follow the spontaneous promptings of his own nature as a separate entity, the result not infrequently showed that what began as individual interest spontaneously transformed itself into class interest. The problem for the class teacher in an ordinary school is just the reverse—it is to make the class interest generate individual interest.

Moreover, the interest should, as far as possible, be mental interest in the ideas on which the lesson depends, and in their expression through the medium of writing. As we have seen, mere interest in the being *able* to write or read is not a really educative interest, at least from the intellectual standpoint.

As the Montessori method of teaching reading depends on the fact that Italian is a phonetic language, it is not equally applicable to English. Teachers who employ the look-and-say method almost exclusively will get little if any direct assistance from studying Dr. Montessori's phonetic method of teaching reading, but the technique of a great teacher is always a matter of interest, and the account in the previous section will repay careful examination even by those who do not employ the phonic method.

CHAPTER VI

THE PRINCIPLE OF LIBERTY

"The voice of Séguin seemed to be like the voice of the forerunner crying in the wilderness, and my thoughts were filled with the immensity of a work which should be able to reform the school and education."—MONTESSORI.

1. *Freedom and Obedience*

THE biological principle of liberty, which is for Dr. Montessori the fundamental principle of education, was formulated by Séguin in very noble language, which loses nothing of its charm from the quaintness of some of its expressions, turned after the fashion of his mother tongue. But it is the language alone which bears the impress of its origin—the spirit is that of humanity.

"One of the earliest and most fatal antagonisms taught to a child is the forbidding of using his hands to ascertain the qualities of surrounding objects, of which his sight gives him but an imperfect notion, if it be not aided by the touch; and of breaking many things as well, to acquire the proper idea of solidity.[1]

[1] This seems bad psychology. The idea of "breakableness" is got by breaking things; that of solidity by handling solid things.

The imbecility of parents in these matters has too often favoured the growth of the evil spirit. The youngest child, when he begins to totter on his arched legs, goes about touching, handling, breaking everything. It is our duty to foster and direct that beautiful curiosity, to make it the regular channel for the acquisition of correct perceptions and tactile accuracy ; as for breaking, it must be turned into the desire of preservation and the power of holding with the will ; nothing is so simple, as the following example will demonstrate : —Once a very excitable child, eighteen months old, touching, breaking, throwing everything he could, seemed really ready, if he had been once punished for it, to become possessed by the old intruder ; but it was not our plan. We bought unmatched Sèvres cups and Bohemian glasses, really splendid to look at, and served the child in one of them, after showing him the elegance of the pattern, the richness of the colours, everything which could please and attach him to the object. But he had no sooner drunk than he threw the glass away. Not a word was said, not a piece removed from where it fell ; but the next time he was thirsty we brought him where the fragments lay, and let him feel more thirst before we could find another glass equally beautiful. Some more were broken in the same petulant spirit, but, later, he slowly dropped one, when, at the same time, he looked into our eyes to catch signs of anger. But there was none there, nor in the voice ; only the composure and accent of pity for the child who could willingly incur such a loss. Since then, baby took good care of his cups and

glasses, finer than ours; he taught his little fingers how to embrace with security the thin neck of one, the large body, or the diminutive handle of others. In practising these so varied handlings his mind became saving and his hands a model of accuracy."

The first thought of many on reading this passage will be the strange and unjustifiable extravagance of letting the child break such exquisite vases. It may be so. Few could afford so expensive a method, and less valuable glasses might have served the purpose as well. Yet if we think chiefly of this, we measure values less truly than Séguin. To the man who was possessed by a boundless enthusiasm for developing the soul even of the idiot, it would have seemed a far stranger, a far more unjustifiable extravagance to disfigure the growing soul of the child by introducing the idea of opposition, which itself creates opposition and anger, and thus tends to implant evil impulses. His thought was not of material damage; it was turned another way. Compared with the soul of the child, all else was to him as nothing. Therein he was the true disciple of Him who said that whoso should cause one of these little ones to stumble, it were better for him that a millstone were hanged about his neck and that he were drowned in the depth of the sea.

The principle of liberty, as contained in the extract from Séguin, bears chiefly on two points, the one intellectual, the other moral. The intellectual point is that the child must be given liberty of action, and,

especially, the liberty of using his hands and thus developing himself; and the earlier chapters have shown on what deep a foundation this belief rests. The moral point is that to forbid the child to satisfy his activities induces a "fatal antagonism." Though this is not developed in the extract given, it is fundamental in Séguin's system. By this "antagonism" he meant the dualism of right and wrong in the child's nature. This dualism, he holds, is founded not in our nature but in our sufferings; to him temper and wickedness are not natural to the child, they are "intruders," due to unwise repression, especially to repression involving a conflict of wills. No doubt to some degree all repression must involve a conflict of wills, but it need not be felt by the child as a conflict in which he has to submit because the adult, being stronger, is able to enforce *his* will, and determined to. In contrast to such a conception, Séguin's view of authority in education is worth studying:— "Authority is like obedience, a mere function, whose existence is provoked by corresponding incapacities; it ceases when its object is accomplished, and is no more inherent in the individual who happens to exercise it than his coat is adherent to his cellular tissue." And again, "Our authority over them does not derive from our superiority, but from our desire of elevating them to our standard. Hence we do not make them feel authority like a pressure, nor obedience like a subjection; but we give them every opportunity of exercising the first themselves in the limits of their aptitude; as well as of acting under the reflex impulse

of the second, whenever their spontaneous impulse is as yet deficient." And again, writing of duties—"Duties being less imperative in an uneducated conscience than rights, we have often to enforce the former to a certain extent by unmitigated authority, as was done for mankind, till the child becomes conscious of the equivalence of these two terms [duty and right]. The right of one is the duty of others [towards him], the duty of one is the right of others. . . . But soon, for the most extreme cases [of idiots], and always for the more ordinary ones, authority need not present itself in its historical features of absolutism, but assumes more tender forms as soon as it is firmly established." [1]

[1] Séguin's view is well illustrated in the following instance; it is in the words of a daughter of the late Bishop Fitzgerald, a man greatly revered:—

"When my sister and brothers were all little,—about 10, 7, 6, and 5,—a boy cousin had directed and helped the two elder ones to construct, or had made for them, in the garden, a little waterpipe of dandelion stalks joined together, which led a tiny jet of water from a barrel to form a tiny fountain: while they were at lunch, the youngest, in some pet or freak of spite, ran out and trampled upon the works: the two elder, enraged, caught him and one held while the other switched him with a twig from a tree. To them, so employed, came my father, asked no questions, spoke no reproof, but took the little offender from them, led him to the strawberry beds and gave him strawberries. The two elder, ashamed and very sorry, gathered some strawberries and offered them, but were told they were not wanted." The account, written after a study of Séguin and Montessori, concludes thus: "Until now I always thought my father had been unjust. Now I think he was transcendently right."

Here there was no anger, no assertion of self; there was authority, but it was the authority of gentleness and peace; against it there

Thus the principle of liberty does not mean for Séguin that children are to be allowed to have their own way in all things. On the contrary, "repression," he says, "cannot be avoided; let it be employed in its mildest forms; . . . the means of repression are what the intelligence and feelings of the teacher make them." In school, at meals, on the playground, how many opportunities, he asks, has not the teacher to oppose anti-social actions, and so to create a sense of moral association, of sociability, and family-like associations.

Here Séguin is writing of idiots; but what is true of them is also true of the very young. They, too, are as yet unripe for the higher aspects of morality; for them, too, the first glimpses of altruism must come from the recognition of the elementary claims which others have upon us, those which are fulfilled by avoiding anti-social actions.

A true disciple of Séguin, Dr. Montessori's view of liberty is in the closest accord with his. Of the mode in which the "fatal antagonism" enters into the child's nature, she gives a vivid picture, one which reminds us forcibly of Hegel's well-known saying about the baby's passionate scream.

could be no rebellion. And no similar offence was ever repeated. Is it likely that such a result would have followed had harsh measures been employed? Even in children we may thus awaken something of Kant's noble conception, that "man refuses to violate in his own person the dignity of humanity." Not the low motive of fear withholds from evil those who are so treated; there is a higher motive; in virtue of it we would not pain those whom we love; but that is not all;– there is the still higher motive, that we feel it an outrage to offend against that which we reverence.

"The child, like every strong creature fighting for the right to live, rebels against whatever offends that occult impulse within him which is the voice of nature, and which he ought to obey; and he shows by violent actions, by screaming and weeping, that he has been overborne and forced away from his mission in life [*i.e.* to develop himself through his own action]. He shows himself to be a rebel, a revolutionist, an iconoclast against those who do not understand him, and who, fancying that they are helping him, are really pushing him backward in the highway of life. Thus even the adult who loves him, rivets about his neck another calumny, confusing his defence of his molested life with a form of innate naughtiness characteristic of little children." This is in accord with the modern view that, as often as not, naughtiness is a safety valve for the escape of nervous energy. The way to banish naughtiness is to give plenty of occupation. But it must be congenial occupation. Satan finds mischief not only for idle hands, but for hands which are doing forced labour.

Again, as with Séguin so with her, the anti-social or disagreeable acts of little children must be repressed. Speaking of schools where the teachers had interpreted the principle of freedom too loosely, she writes:

"I saw children with their feet on the tables, or with their fingers in their noses, and no intervention was made to correct them. I saw others push their companions, and I saw dawn in the faces of these an expression of violence; and not the slightest atten-

tion on the part of the teacher. Then I had to intervene, to show with what absolute rigour it is necessary to hinder, and little by little suppress, all those things which we must not do, so that the child may come to discern between good and evil.

"If discipline is to be lasting, its foundations must be laid in this way, and these first days are the most difficult for the directress. The first idea that the child must acquire in order to be actively disciplined, is that of the difference between *good* and *evil*." [1]

This is the true rule of education. We are, within limits, under an obligation to repress that which is inherently evil or anti-social, but we do offend if we place the child in such circumstances that we must repress those inner activities which are in themselves desirable, being founded on the very nature of the growing organism, and being, in fact, the activities which are necessary to its full development.

It is in regard to this question of repression that the inexperienced Montessori teacher appears to find the greatest of her difficulties. Although, as Dr. Montessori says, it is the first few days that are the most difficult, she gives us no suggestion as to how these undesirable actions are to be repressed. Yet, if the principles be understood, the matter does not really

[1] This does not mean that the child is to understand the abstract distinction between good and evil, as adults understand it, or think they do. It merely means that the child is to recognise what kind of conduct is permitted to it and what kind is not permitted to it. The distinction at the earliest stage relates altogether to conduct though that will form a groundwork for moral distinctions later on.

present any especial difficulty. Whatever hesitation the teacher may have in suggesting to the pupil that he should do this or do that, instead of leaving him to choose his own occupation, she should have none in gently and firmly checking bad conduct. Séguin's suggestions for establishing a moral control over idiots are much to the point. Like a naughty child, an idiot, he says, "is determined to do nothing. We are equally determined to make him do something; thus matters stand. Will the idiot or we succeed? If we cannot enforce our first command, the idiot will feel superior to us, and many trials will be in store before the legitimate ascendency can be established. Therefore, the line of demarcation between that which the child can safely refuse to do and that which he may be obliged to perform is of great practical value. We establish that line by showing that it is generally easier to repress than to produce actions, and that the idiot may sooner be refrained in his instinctive manifestations than forced to produce intelligent ones: this is the line. Our first orders, therefore, those which must be obeyed, or else the whole treatment is compromised, must be chosen from the class of things which can be made to be. For instance, we must not order, at first, a child to open his mouth, for what power on earth can make him open it if he will keep it closed against your order? But, on the other hand, what opposition can he offer to our command not to scratch his face if, at the same time, we hold his hands?"

Take a practical application—A young child makes

a face at another. It is right to show that you are sorry or displeased—to say that it is not nice behaviour. But it is not right to say, "I forbid you to do that again." If you see children quarrelling, it is right to separate them, using just sufficient force, and using it gently. But for reasons stated earlier (p. 104), it is not right to say to very little children, "If you do that again I shall punish you." If such threats enter at all, they belong to the later stage, when the child is able to guide his present conduct by paying heed to its future results, and he cannot do that in the very early stages of childhood. If reproof or punishment is needed it should be immediate, and, if possible, such as will be perceived by the child as fitting the offence; the delay in giving a drink to the child who broke the glass is an example. And the manner of such punishing should follow that example too. There should be "no sign of anger; only composure, and the accent of pity for the child who could willingly behave thus."

By degrees, as Séguin says, the child will, under such treatment, insensibly grow to obey any order we give, not because he cannot avoid it, but because he feels he ought to do it, and finally, because he likes to please us in so doing. In a passage of rare beauty, Dr. Montessori puts the same idea. Speaking of the stage in which the education of freedom has done its perfect work, she writes: "This is the period in which the child runs joyously to obey, and leaves, at the most imperceptible request, whatever is interesting him, so that he may quit the solitude of his own life and

enter with the act of obedience into the spiritual life of another."

"Our first orders . . . must be chosen from the things which can be made to be." By this Séguin only meant, things which *we* can control, whether the child wills them or not. But it is equally important to be sure that they are things which the child *can* do, *if* he wills to do them. Unless we know that he can do them, we ought only to *suggest* them, or at least if we order, we must not insist. On this point Dr. Montessori quotes an interesting observation by a teacher, one of her own pupils, as to the different stages in learning how to do a thing. First, there are the unsuccessful attempts, when the child fails or perhaps only succeeds imperfectly. Then comes a time when, without quite knowing how it happens, he chances to succeed. At once delighted and surprised, he tries it again but fails. After more practice comes the next stage, when he can nearly always do it if he wants to, but makes mistakes when some one else asks him to do it. "The external command does not as yet produce the voluntary act." When he can *always* do it himself, then the child is [usually] able to obey the command. This, as she says, is every one's experience with children, whether in school or at home; and though the observation is very far from being universally valid, it is well that the teacher should pay great regard to the existence of these stages in learning, lest she treat the pupil as if he were in a higher stage than he is. It often happens that a child

is told to do something which, though he has done it before, he cannot readily do at will, and then, when he bungles at it, he is reproved, or told that he is not attending, not trying to do it. But, in truth, the child *cannot* even try; the desire to do the act does not produce it, but rather interferes with the doing of it. The act may come of itself, as it were, but when we strongly desire to do it, we set up a concentration of nervous energy which must pass off in some direction, and along some path, be it the right one or not; and if the desired direction has not, through practice, become easy, it is more than nine chances to one that it passes off in the wrong direction, for there is but one right direction and many more than nine wrong ones. The very strength of the desire prevents its realisation, because the greater the accumulation of energy, the more difficult it is to restrain it from passing off along one of the forbidden paths. Or, to put it from the psychological rather than physiological point of view, too great eagerness defeats itself; it is when we are eager that we become flurried. So the stammerer, who can speak readily enough when by himself and when nothing depends on it, becomes tongue-tied in the presence of one who expects an immediate answer. So with most of us, there are many things that we can do easily and well of ourselves, and when not under supervision; we cannot do them rightly if some one is standing over us to watch. He may say nothing, he may do nothing—the mere fact of his presence disturbs our volition; we cannot summon the hidden springs of our action to do our will.

The ease of an action depends on our familiarity with it. It is not, as many unthinkingly suppose, a property of an action in itself to be easy. No action is easy until the nerves have become accustomed to send the necessary stimuli to the muscles. The teacher and the parent have practised so many and so various actions that even in those things which they may think they do for the first time there is little that is really new. Old and familiar actions are but combined in slightly different sequences. Adults are often slower to learn new actions or new combinations of actions than are children. The reason is evident—as we grow older our nervous system is less plastic. The boy or girl will learn to ride a bicycle quicker as well as better than the grown man or woman. Thus it often happens that when we ask a child to do some task which is to us quite familiar, we do not realise that to the child it may require that the nervous energy shall pass over new paths. When we order a new pattern of metal vase, the metal worker must make a new mould before he can begin on the vase itself. So the child, confronted with a new task, must make a new path for the discharge of nervous energy. Are we not right to insist that he must be given time?

2. *Freedom and the School*

Several side issues have cropped up in the discussion; still, the meaning to be attached to the principle of freedom in the Montessori system has

been tolerably well outlined. It appears to include (1) that we are to provide full opportunity for the exercise of the child's motor activities so far as they are not anti-social, and (2) that while we are to repress anti-social activities we are to do so with as little conflict as possible between the child's will and our will. The second condition has, however, been but incompletely stated. For one very important part of education consists in the corrections of the child's mistakes. Here, too, there is to be as little clashing of wills, as little exertion of authority as possible. The child is to develop his own powers through his own experience, as free as possible from the domination of a superior mind. This is not only because we thus avoid the conflict of wills with its antagonisms and emotions, but also because we get the child into the habit of depending on his own mental process rather than on the assistance of the teacher. Hence it is desirable that, so far as is possible, mistakes should be corrected without the direct intervention of the teacher's authority. In the training of the senses and the muscles, this object is very ingeniously attained by using apparatus in which the child cannot help detecting his mistake himself. And in the mental world we have already seen with what extraordinary care Dr. Montessori guards against the corrections, by the teachers, even of a definite mistake (see pp. 133 and 155). Better, she holds, that the child should merely forget, without knowing that he has made a mistake, than that he should feel dependent on the teacher. Physical freedom is not enough.

There must be mental freedom as well. And true mental freedom, she holds, is impossible for those who habitually accept the authority of another.

Of all the applications of the principle of freedom, the most far-reaching and the most original is the general liberty of the school-room. The door is always open, so that the children can leave when they desire —the chairs and tables are so light that the children can carry them about and choose their own places; nor need they sit still longer than they desire. This freedom serves a double purpose. First, it promotes the welfare of the pupil; next, it helps the teacher to discover the natural tendencies of the child.

Nothing may seem more natural than that children at school shall be seated at desks, yet nothing is really more unnatural. The numberless improvements which have been made in school chairs and desks—as in adjusting them to the height of the pupils and so designing them, with foot-rests, etc., that the pupils are almost forced to sit in proper attitudes —these things afford striking evidence of the harm done by the compulsory position, whether only in its lowering effect on the general health, or in its more specific ill-effects, such as chest contraction and spinal curvature or weakness. The method which should succeed in banishing these fixed chairs and desks from schools would do an incalculable service to the nation, but there are many difficulties in the way. Not only is there the natural conservatism of

the educational system, but there is the very practical difficulty of floor space, which, for a given number of children, should be about double as great for the Montessori school.

The second advantage of the free school is that it serves as a psychological laboratory in which the teacher can observe the pupils. All educationists are agreed on the importance of founding education on a study of the child. But not all are agreed on the conditions under which the child ought to be studied. Dr. Montessori rightly observes that child study, to be fruitful, should be the study of the child when he is free to manifest himself, and that the child who is under the ordinary discipline of the school-room is not free. It would, for instance, be absurd for the naturalist to study the habits of the fauna of the forest by making a series of careful observations on their representatives in the Zoological Gardens, because, deprived of their liberty, their nature is altered. Perhaps the analogy puts the case rather too strongly, yet it serves to illustrate the point. The essence of child life is bodily activity and movement, especially of the larger muscles; the essence of the school-room is immobility, especially of the larger muscles. It results that we are observing, not the free organism of the child in its normal condition, but rather an organism constrained and impeded in regard to the most fundamental of all its activities.

There is nothing new in this. We all recognise that if we really want to learn what the child's nature is, we must observe the child when freed from artificial

restraints. Where Dr. Montessori has advanced is in applying the knowledge to school-room practice far more thoroughly than any of her predecessors or contemporaries. Perhaps there is not very much that is new in the observations she has made. The more important may be classified under the following heads, and it will be seen that they are familiar enough. Some readers may be disappointed; others, reasoning more justly, will be the better satisfied to accept them.[1]

3. *Repetition. The Process, not its Result*

We have seen that the first stage of early education must be through the motor side—that even in what we call sense training there is a motor element. Moreover, the desires of the child are all directed towards *doing* something; and it is by *action* that his senses as well as his muscles are best exercised. Nature has provided that, in the early years, the child shall be intent on the process in itself, far more than on its result. Action for action's sake—that is the motto of early childhood. In this respect there is a contrast of exceeding significance between the adult and the child. Even to the vagabond, labour is most distasteful when it has no purpose—it is said that a workhouse master got rid of a pest of tramps by setting them to continue loading and unloading a cart with stones.

[1] In connection with the Montessori rejection of the current notion of discipline in the classroom, it is interesting to note that in the ancient Persian schools, that scholar was accounted to be the best who wriggled most and shouted his lessons the loudest.

It was the uselessness of the labour which disgusted them most.

With the little child it is exactly the reverse. Give him a pail and a spade and some sand, and as soon as he has filled his pail he will empty it in order to fill it again. Whatever the operation may be, he repeats it again and again. Thus Baby Preyer, when fourteen months old, took off and put on the lid of a can seventy-nine times without a single pause. Instance after instance of a like persistence might be given. Even in the mental world, a similar desire for repetition shows itself. Any one who has once told children a story they liked, knows how they love to hear it again. But no significant word may be altered—if you do so, you are corrected at once; at least so it is with many children.[1]

[1] This characteristic is not confined to children—there are phases of adult life in which it is equally prominent. When a poem has become familiar to us, the change of a word jars, even though neither the accent, the rhyme, nor the meaning be changed. It fails to satisfy us, not because of a change in the idea conveyed by the words—it may be infinitesimal, but because of the change in the appeal to our sensuous enjoyment. The beauty of poetry is twofold; so far as it belongs to the intellectual side, the change might even be pleasing, but on the sensuous side, satisfaction is in exact repetition. And the adult may get even more completely to the level of the child when he is resting the intellectual side—when his play is on the motor side. We may find a parallel to Baby Preyer's seventy-nine removals of the lid in the absorbed way in which the adult throws stone after stone into the water on a summer holiday. One of Dr. Montessori's illustrations has a very kindly humour and is very much to the point. "No two persons could be more convinced of mutual love than sweethearts, and yet they are the very ones who repeat endlessly that they love each other." The illustration is very much to the point as to the enjoyment of the repetition of motor processes; it is

The tendency of the little child to repetition, and its significance in education, is a matter on which, in common with all observers of children, Dr. Montessori rightly lays the greatest stress. It is, indeed, of paramount importance to allow the child to satisfy the demand of his own nature for repetition. Repetition is as necessary for the development of his nervous system as digestion for the growth of his body.

The reason becomes plain when we remember that the nerve cells grow only through exercise. If a nerve cell were like a muscle, there would be no objection to changes, one kind of exercise would answer as well as another. But as each cell is useful only so far as it is trained to act in co-operation with other cells, they must be trained to act in concert, just as a musical choir is trained, and this can only be done by long continued repetition of the same sequences of action. Thus only do the nerve cells in the one case, as the individuals of the choir in the other, become capable of easy and harmonious action.

The sets of cylinders, cubes, prisms, etc., which constitute so large a part of the "didactic material" used by Dr. Montessori, have been devised by her as the best way to give opportunity for the very small child to organise his nervous system by repetition.

also very far from the point. For with the child it results from an inner tendency to perfect the organisation of the nervous system through activity; with the adult it results from three very powerful tendencies belonging to stages at which the child has not yet arrived. First, there is the tendency to find motor expression for an idea; second, the social tendency towards sympathy; and third, the tendency to be attracted by the opposite sex.

It is very likely that they may not be quite as attractive to the little child as the cans and lids used by Baby Preyer, but they have other advantages—they are not so noisy; and as they are arranged in a regular progression from perceptual to intellectual activities, they give a more systematic training. It is, however, *by their continued attraction for the little child that they must be finally judged.* This is a doctrine which may meet with a good deal of opposition, because it seems an assertion, in extreme form, of what is commonly known as soft pedagogy. As here given, it is not really open to this objection, partly because it relates only to very young children, and partly because the stress is to be laid on the word *continued.*

In this connection nothing is more important than to *let the child exhaust his impulse.*

Time after time has the writer seen those in charge of babies or young children "keep them amused" by giving them one toy after another in quick succession. As soon as any sign of lack of interest appears, the occupation is changed. These good people do not seem to realise that this is exactly the course by which we should train children to be inattentive; to want change; to be easily distracted, or, in other words, to be the creatures of their environment; to be without self-control and incapable of persevering at anything. If we create and foster this tendency in them when they are young, we have only ourselves to blame if we cannot eradicate it when they grow older.

Not infrequently the motive in providing this continual variety seems to be the pleasure of the

adult rather than the benefit of the child. It is very pleasant to see a joyous response on the child's face as the new toy is given. But when we indulge our-

Fig. 2.—Boy absorbed in his Work.

selves thus, the baby becomes to us a toy to be played with, rather than a personality to be developed. If indeed we are followers of Herbert Spencer, we may delude ourselves into the belief that by keeping the child constantly in a state of "pleasurable excite-

ment" we are giving it an ideal environment;[1] the word excitement, used by Spencer, is singularly inappropriate. If we substitute *long-continued absorption* for *pleasurable excitement,* we shall not be far wrong. We may readily judge of this by the expression on the face. Who could doubt that the little boy in Fig. 2 is doing educative work?—work, too, which will tell in the formation of character as well as in the training of aptitudes. The child's expression gives no indication of excitement, nor of consciously pleasurable feeling; rather it shows a determined effort, an output of mental energy with real driving force behind it. Thus it is the index of a much more valuable process than the pleasurable absorption shown, *e.g.*, in the faces of children listening to a story, as in Fig. 10. In the one, the child's energies are for the most part constructive; in the other they are receptive; and it is constructive work which we value most,—in part because of its intrinsic usefulness, and in part because we find it so much harder to cultivate than receptivity.

4. *Let the Child do his own Thinking*

While mothers and nurses are generally ready to let a baby do his own physical exercise, those in charge of

[1] "As a final test by which to judge any plan of culture, should come the question—Does it create a pleasurable excitement in the pupils? When we doubt whether a particular arrangement is or is not more in harmony with the foregoing principles than some other, we may safely abide by this criterion." *Education*, chap. ii. principle 7.

children are but seldom ready to let them do their own mental exercise. Almost every one would disapprove if, whenever the baby wanted to get about, the nurse always lifted him instead of letting him creep or toddle. Yet they are quite ready to lift him over his mental difficulties, instead of letting him surmount them himself.

The tendency is so general and so difficult to overcome, that it is well to examine its foundations.

Nature has provided that we shall enjoy watching the processes by which the baby grows, and has thus secured that we not only permit but encourage him to continue them. Suppose, for instance, that he is trying to roll over a cushion on the floor; we watch the tiny efforts with the greatest interest; he enjoys it himself, and we enjoy it with him; we are quite disappointed if the nurse marches in and carries him off in the middle of his efforts. But when a few years have passed and the stage for grappling with mental problems has come, all is changed. There is no pleasure in watching the look of puzzle on a face; it irks us not to help when a word or two will end the difficulty; so, out of mere good nature, it may be, we help him. Or perhaps we may have a better reason—we may feel sure that he must be on the wrong lines of thought—the thing seems so easy that if he were not, the solution would surely have dawned on him earlier—and so we judge that the time for help has come.

While the last reason is a valid one, there are very few of us who make sufficient allowance for the time the pupil does require for his mental processes. As

has been already pointed out, unless the brain has been organised already for the thinking implied in the problem, the pupil has to do the organising of the brain before he can reach the solution. "Quick as thought," we say; but thought is only quick when it travels along prepared paths. Travelling is quick when the railway is made; but, counted from the time we begin to lay the line, it is long before the first train completes its journey. Unless we recognise a similar difference between the organised brain of the adult and the unorganised brain of the child, we shall be almost certain to expect the child to think more rapidly than the conditions of the brain permit. For the development of his real thinking power, only one thing can be worse for the pupil than to expect him to think too rapidly, and that is, to interrupt him in the process of thinking.

This is no mere arm-chair psychology. Time after time has the writer seen a child told to think, or to remember, and time after time have the seniors been on the point of interrupting the process of thinking, by hints, or by telling the answer, usually in the form of a question, "Don't you see so and so?" Had they realised the significance of the child's expression of puzzle, they would have seen plainly in it the evidence of mental action, which their premature assistance rendered abortive. Time after time has the writer interrupted the interrupters, and secured for the child the satisfaction of overcoming a difficulty, either quite unaided, or, it may be, with no further hint than an encouragement to go on thinking, and, in some cases,

the suggestion of some mode in which the solution is more readily found.[1]

There are probably very few who, when it is pointed out to them, will not admit that thus habitually to thwart the process of thought in children must have the most serious consequences. We often hear complaints that University students and school pupils in the higher grades cannot or will not think ; that while we can get them to remember, we cannot get them to take the real trouble needed to understand ; that they will not use their brains. What can more surely tend to such a result than to stop them in the middle of using them ? Nature rebels against useless processes ; still more does she rebel against those processes which, having been commenced, are habitually stopped before completion.

The matter is of such paramount importance, and so many parents and teachers seem unable to realise their mistake, that it is better to labour the point, even at the risk of being tedious.

Let us ask, then, why we are so apt to interfere with mental processes, in contrast to our encouragement of physical processes. One reason has been given—that it is pleasant to watch a child overcoming a physical obstacle, while the expression of puzzle seems to call for assistance. But there is another—our own impatience. To watch for some expected yet delayed

[1] This and the next paragraph are taken from one of a course of lectures delivered in Trinity College, Dublin, in 1903. The form in which they are put refers more to older children than those of the Montessori school, but the substance is true for all.

event; to wait when there is nothing to divert our attention from the delay; that is the sure way to breed impatience. When the baby is tumbling about we are watching the process, rather than waiting for its conclusion. Like the audience looking at a play, the mere movement of the child appeals to our sensuous interest. But when the pupil is overcoming his mental difficulty, we cannot see the process, we can only wait for its conclusion. We are no longer the audience looking at the actors; instead, we are waiting for the curtain to rise. Our impatience arises from our enforced passivity. If through some accident the curtain were raised, the impatience of the audience would disappear with the interest of watching the process of scene-shifting.

It is this which makes it so hard for us to give to the child the time he needs. The curtain which conceals those physiological processes which, in the child's brain, bring order out of disorder as the problem is solved—that curtain is never raised for us. If it were, there would be revealed what we must believe to be the most wonderful process of growth in the whole organic world. Absorbed, we should watch it as we might watch the growth of some great work of art. Then we should resent it if, in thoughtless good nature, some one were to interrupt the process by giving the solution, for to us it would seem that the true work of art had been suddenly destroyed and a flimsy imitation put in its place. If such interferences are infrequent, the injury may be but trivial, for the brain of the child has great recuperative power. But if they are habitual, it is

beyond doubt that the character of the brain is altered —it ceases to respond to the stimulus of having to solve a problem; it cannot do what we rightly call hard brain work. The child so treated grows up ready to let others work while he looks on. He may see nice points when they are put to him; he may be a critic—and more likely to find faults than to find excellences; but he will not do really solid mental work.

We have seen in the previous section that, in contrast to the adult who works that he may attain ends, the child works right through processes for the mere satisfaction of it. We see the reason here: to the child, though he does not know it, the process is the only way to attain what is for him the most valuable of all ends, his own self-development. We constantly recognise the need of actually working through processes, *e.g.*, when we lament the fact that thousands satisfy their love of games by looking on at a football match instead of by playing football. Yet, under the impression that we are helping him, we too often compel the child to play the part of the spectator while we do the work through which alone the real benefit comes.

It is this spirit, manifested alike in the school and in the home, which Dr. Montessori has in mind when she condemns "the general habit of considering the act of knowing as something final." Those who tell the child the answer to his problem are acting as though the one thing of importance is that he should know the answer. But the more "trouble" we save the child, whether in things physical or mental, the more injury we do him, and, usually, the less of real happiness and

satisfaction we allow him, for it is fair enough to say, as she does, that his own self-development is his true and almost his only pleasure. The mother, or the nurse, who washes and dresses the child does it "always with the same erroneous idea that the [only] end to be attained is the completion of the action," whereas, until the child can do these things for himself, the important thing is that he shall go through the process To save time, we do what he might do, and when we are depriving him of the opportunity of exercising his own powers, we complain because he does not quietly acquiesce, but instead, manifests his impatience of being compelled to be inactive. That impatience, of which they so often complain, should afford the greatest delight to his mother, to his friends. For without it, without the desire to do things himself, the child would never develop. We speak of the "divine discontent" of the man, because it urges him to something higher; a thousand times more should we speak of the divine impatience of the child, which is so often his only means of protest against the wrongs he suffers at the hands of those who love him.

It is hard for us to look at the commonest matters from the child's point of view. When we blame him for impatience, because he will not stay quiet while we do something for him, we forget how impatient we get when we are kept idle while another does what we want to do. Whose fingers have not itched when, standing idly by, he has to wait while some one else pokes the fire or turns over the pages of the dictionary to find the word he wants? Then, good breeding prevents our

interference ; we curb our impatience while our friend does what we would do—we should displease him did we take the poker or the dictionary from him and force him to idleness, for it is the idle one who feels impatient. Or, to take another example, it is the one who has asked the riddle who wants to tell the answer, not the one, who, thinking he can solve it, is trying to think on. But when it is a child who is thinking or asking, we forget how we ourselves should feel in the like case ; no consideration of good breeding restrains us ; on the contrary, it seems to us that it is the child who should be passive, who should show *his* good breeding by being grateful that we have saved him trouble ; it is ours to command, it is his to obey.

All life entails compromise of duties. Only one aspect of the duties of the adult to the child is dilated on above. Often the reply of the parent, the nurse, the teacher will be—we have not time—we have so many other things we must do, that we cannot let the child have time. It is true—to provide food and clothing for him is the most imperative of all duties towards him—and duties towards others may be more imperative than duties towards the child. Yet in this there lies a danger. Because there is sometimes good reason for ignoring the child's claim to live his own life ; because it is often necessary that he should obey without question, so as to leave us free for prior duties, therefore we are apt to require the same ready obedience where there is no necessity to enforce it—we are apt to think that the right to claim obedience from the child belongs to us as individuals—that being adults, we

are more important than he is, and therefore entitled to more consideration. This is but a form of the crude morality that might is right; the higher view is that our claim to his obedience is founded on our obligation to perform other duties, which, if he did not obey us, we could not fulfil. And there can be little doubt that children will yield the readiest and most unquestioning obedience to those who require it on worthy grounds, and not merely as a tribute to their greater age, greater power, or greater importance.

5. *The Principle of Freedom; its Physiological Foundation*

Considered as a justification of the Principle of Freedom, it may be fairly urged that much of the foregoing discussion is beside the point. So far as it enforces the truth that it is only through actual process that the nervous system can be educated, all may agree; but the real question remains untouched—namely, whether the child is best educated by doing what he chooses, or what a wise guardian ordains.

Again, it may be asked, what does all the talk about Séguin's "antagonisms" really amount to? Every one knows that if you do not cross a child, there will be no ebullition of temper at the moment; but the real question is, will the child not grow up self-willed, incapable of giving way to others, of bearing disappointments? In support of this it may be urged that even the strongest advocates of the doctrine of freedom admit that where it is fully carried out, it will end in

disaster. Dr. Montessori herself speaks of the "absolute rigour" with which "all those things which we must not do" are to be "suppressed, destroyed." In default, therefore, of some attempt to justify the apparently arbitrary line which separates those spontaneous activities which are permitted to the child from those which are not permitted, it seems not unreasonable to assert that what a supporter of the so-called Principle of Freedom really means by it is—"Children are to be free to follow such spontaneous impulses as I think desirable; those which I think undesirable are to be suppressed, destroyed."

The objection is, indeed, obvious, for nowhere does Dr. Montessori supply any psychological or physiological justification for suppressing some spontancities and encouraging others. It is little wonder that cold-blooded, logically-minded readers become impatient when, having found on one page such an enthusiastic sentiment as "we cannot know the consequences of suffocating a *spontaneous action* at the time when the child is just beginning to be active; perhaps we suffocate *life itself*. Humanity shows itself in all its intellectual splendour during this tender age, as the sun shows itself at the dawn, and the flower in the first unfolding of the petals; and we must *respect* religiously, reverently, these first indications of individuality," they find on the next page; "it is, of course, understood that here we do not speak of useless or dangerous acts, for these must be *suppressed, destroyed*."

Nevertheless there is such a justification, and to those who recognise that the distinction she draws is

founded on a sound view of the development of the child, the poetic language in which she often writes will rather stimulate than repel. For it shows us something of those qualities of enthusiasm and devotion to which her great influence on children is in part due. For if enthusiasm unguided by knowledge is dangerous, it is equally true that in dealing with little children, knowledge uninspired by a reverent enthusiasm is but little worth. And if "*The Montessori Method*" is not a mere, and perhaps, we might add, not an adequate exposition of the method from the philosophical point of view, we have the more reason for gratitude in that it gives us a revelation of the personality of a great teacher, such as we could never gather from a mere scientific exposition. Not by precept, but by example, it teaches us the chief lesson of all, that reverent and devoted love for the child is the most important of all qualities in those who would teach the very young. In this too, as in all else, Dr. Montessori is a true disciple of Séguin. Never, surely, was the spirit of the true teacher more clearly shown, never was his spiritual reward more nobly expressed, than in Séguin's words, written after many years of strenuous labour :

'We looked at the rather immovable, or ungovernable, mass called an idiot with the faith that where the appearance displayed nothing but ill-organised matter, there was nothing but ill-circumstanced animus. In answer to that conviction, when we educated the muscles, contractility responded to our bidding with a spark from volition ; we exercised severally the senses, but an impression could not be made on their would-be material nature without the impression taking its rank among the accumulated idealities ; we

were enlarging the chest, and new voices came out from it, expressing new ideas and feelings; we strengthened the hand, and it became the realiser of ideal creations and labour; we started imitation as a passive exercise, and it soon gave rise to all sorts of spontaneous actions; we caused pain and pleasure to be felt through the skin or the palate, and the idiot, in answer, tried to please by the exhibition of his moral qualities; in short, we could not touch a fibre of his without receiving back the vibration of his all-souled instrument.

For one who, by his example, can teach us thus, there are many indeed who are competent to deal with the dry bones of the psychological or physiological principles of education. Nevertheless the work of justification is not unimportant. For however we may disguise the principle of liberty by the use of semi-scientific phrases like spontaneous development, yet so far as it is to be applied, it amounts to neither more nor less than the assertion that children are to be given their own way, to do what they like. Is there then any especial justification for applying this principle to the very young? We know that to apply it indiscriminately, and to older children, results in serious injury to character—in want of self-control, in weakness of will, and so on. The seriousness of the objection is admitted. Unless we can show that there are reasons why these ill results are not likely to follow when the principle is applied to the very young and with the limitations laid down by Séguin and Dr. Montessori, people will be apt to believe that anything especially good in the results attained must be due to something in the personal qualities or practice of those who adopt the method, and that whatever is valuable is attained rather in spite of than

in consequence of the principle on which it is supposed to be based.

There is no difficulty in answering the question asked above. There *are* reasons why such treatment is peculiarly applicable to the very young. It is well known to physiologists and medical men that the infant is exceedingly liable to convulsive actions—that is, actions which are caused by sudden or excessive discharges of nervous energy along this path or that, as "chance" may determine in contrast to the discharges of later life, where the brain is organised, and the path of discharge is determined in relation to the rest of the nervous system. These convulsive discharges are injurious, because, like all passages of nervous energy, they leave the nerve cells along which they pass in a different condition from that in which they found them—they do, in fact, take their part in *organising* the nerve cells, and they organise them in undesirable ways. If they are frequent and excessive, they often lead to idiocy. This tendency to uncontrolled nervous discharges marks a clear distinction between younger and older children.

When once the fact is clearly realised that it is by the discharge of nervous energy that the brain is organised, it becomes evident that there are serious dangers in interfering with the healthy spontaneous manifestations of the young. For every healthy spontaneous manifestation is due to the discharge, along a normal path, of an accumulation of nervous energy. We may prevent its discharge along that path, but we cannot prevent its being discharged,

because it must discharge itself along some path. When the child is old enough to have acquired what we call self-control, there may be little risk in our interfering with his spontaneous action, for he may be able to direct the energy along some desirable path, one which will help to organise the brain in a proper way; but where the child is too young to have acquired self-control, and we simply stop the normal channel of discharge without providing some other outlet, then the path along which the nervous energy actually discharges itself is a mere matter of chance—*we* cannot control it, nor can the child. Whether it will do mischief or not no one can tell. At all events, we have no lack of warnings. One may be mentioned here. We have seen, in connection with the cause of stammering, how disastrous may be the result of stopping the spontaneous discharge of energy along the nerves to the left hand, when we compel the left-handed child to write with his right hand.

It will help us to realise something of what is implied in keeping a child still, if we consider the immense part the motor activities play in his life. They are to the child even more than our thoughts are to us. For the mental world of the very young child is so undeveloped that its motor activities constitute almost the whole of its conscious life, while our conscious life includes a whole world of thought, feeling, and actions; or, to put it from the physiological point of view, so far as nervous energy is not required for the unconscious operations of the organism, it tends in the very little child to discharge itself almost wholly

in motor activities, but, with adults, it may discharge itself either in motor or in mental activities. Thus we see that to tell the very little child not to move, is just on a par with telling the adult neither to move nor to think. If he is very tired, the adult may be able to obey. If he is fresh and vigorous, it is a physiological impossibility that he should. For to be fresh and vigorous is to have accumulations of nervous energy which *must* overflow along some path or other. Even in the adult, self-control does not mean that he can stop up *all* channels of discharge, but only that he can direct the energy along this or that channel at his will. Even the adult usually acquires this control only in regard to the less vigorous of his motor impulses or of his thoughts. When we remember how difficult it is for us to stop thinking of what our minds are bent on thinking of, we may get some idea of what it is for the child to stop doing what his muscles are bent on doing. For to tell him not to move those muscles which his nervous energy is just going to set in motion, is on a par with telling the adult not to think of the thing on which his mind is bent.

We must not, however, overstate the case. Even quite young children may often remain still for considerable intervals. They may do it of themselves when shy, when tired or listless, or when cowed through habitual repression, or, again, they may be absorbed in some occupation, the difficulty of which calls for all their attention. Thus all the larger movements and all the uncontrolled movements are inhibited in the boy shown in Figs. 6, 7, and 8

(Chap. VII.), because the nervous energy is all directed to the solution of the problem which engages him, and the only apparent movements are the very slight ones required to adjust the positions of the cylinders.

Even with restless children the skilful teacher may often divert the nervous discharges from the motor channels at her will. When the word of command, or better, of suggestion, is given softly, and with features and form in repose, then the children may find it easy to imitate the teacher's calmness; all excitement may subside and every movement be stilled. Nor is imitation our only aid. We may tell them to be as silent as mice; and with them as with us, the idea will help to its own realisation. It is by such means,[1] not by the mere force of their self-control, that we can get children to sit really quiet. If any one doubts this, let him picture the result of a loud and excited order to a class of restless children to "Sit still!" accompanied by energetic gestures, or by a vigorous threat of what will happen to them if they don't obey. It is not that such commands are never obeyed; they would be immediately effective if the command were to run away.

As an analogy has been drawn in an earlier paragraph between stopping thought and stopping movement, it is well to observe that the analogy is very far from being complete. For while a thought can only be inhibited by not letting any nerve discharge pass along the corresponding path, the movement of a limb can be inhibited without withdrawing the

[1] See the "Games of Silence," Chap. VII.

stimulus which actuates the moving muscle. For instance, if the forearm is being moved up, we know that a discharge is passing along the nerve to the biceps muscle, and we can stop the upward movement not only by inhibiting the discharge, but by stimulating the opposing muscle, that at the back of the arm, by means of which we move it downward. We have only to adjust the two stimulations so that the upward force due to the one muscle is exactly neutralised by the downward force due to the other. That is what we actually do when we hold the arm tense or rigid.

This kind of inhibition involves a considerable expenditure of nervous energy,—the point of the Delsartian relaxation of the muscular system is the saving of energy due to the careful avoidance of all such opposing strains. Thus to relax altogether, so as to avoid all expenditure of nervous energy, is physiological rest, which differs somewhat from Dr. Montessori's conception of rest. Hers might perhaps be more appropriately called psychological rest—"True rest for muscles, intended by nature for action, is in orderly action" and, very finely put: "To act in obedience to the hidden precepts of nature—that is rest."

It is difficult for the adult to maintain, by force of will, this complete relaxation for a considerable interval; indeed there are many whose tense features or clenched teeth or fingers indicate that while nominally at rest, they are in reality wasting their energy in the simultaneous stimulation of opposing muscles.

And what is hard for the adult is all but impossible for the very young. A lively child of three or four has so little self-control that his motor impulses are scarcely at all subject to his volition. If we would have him sit still, we must ourselves provide some outlet for his nervous energy, and, as we have seen, the skilful teacher may often succeed in this. But if no such outlet is arranged for him, if he is merely ordered to sit still, he will presently begin to swing the legs or arms, or sway the trunk or head. An active child of six or seven will, however, be able to sit still much longer, not so much because he can exercise a voluntary control over his motor impulses, so as to inhibit them completely, as because he can send opposite stimulations to opposing muscles and thus keep tense and rigid,– a mode of adjustment which is beyond the volition of the younger child. But even here the want of stillness will be apparent to the close observer. This is because the various impulses to the opposing muscles do not quite neutralise each other; and, as first one muscle acts too strongly and then the other, we see the twitchings which result from the uneven stimulations of the muscles. After a longer interval one may see many of these tense twitchings—the hands may be clenched, the eyes may be set, and so on.

Such nervous strains are injurious. It is certain that to get into the habit of sending opposing nervous strains which, though they neutralise each other as to action, yet exhaust the store of nervous energy, must be wasteful, if nothing worse. There is, however, little

doubt that it is a positive as well as a negative injury. We see in the jerky, irregular, and angular writing of many of our university students the ill-effects of these opposing forces—instead of holding the pen easily in the hand, it is held with tense and jerky fingers. We see it in tense faces, faces in which the muscles are not in repose, but strained. Now, if a muscle be not in repose, it must move the part on which it acts, except the motion be opposed. This opposition usually comes from an opposing muscle, in which case there is a double loss of nervous energy; or if from, *e.g.*, the pull of stretched skin, there is still a loss, but not so much.

Beside such injurious actions, there are many others which we should strive to prevent or modify, such as excessive excitement, whether called into being by an unsuitable environment, or arising from a want of balance in the organism. They cannot be enumerated; to deal wisely with them, determining, as each case arises, how far mere discouragement should be tried, or how far positive suppression, these and the many other difficulties which present themselves must be left to the knowledge, or the sympathy, or, it may be, the prejudice, of those in charge.

It is evident from the foregoing that there will be a marked distinction between actions which primarily relate to the development of the senses and the muscles, and those which relate to social conduct, and that the principle of freedom is likely to be a far more reliable guide in reference to the former than to the latter. For even in the long course of civilisation the physical

organism of man has changed but little; in regard to it the spontaneous activities of the child are far more likely to be desirable than in regard to social relations, which have changed immensely within historical times, and which even now differ greatly in different countries and in different social classes in the same country. Thus there are many actions which are undesirable for the citizen of a civilised state, and which are yet spontaneous in the child. If these be permitted to the child, then, being repeated, they tend to become habitual, thus making it much more difficult to eradicate them afterwards. Hence they stand on an entirely different footing from those motor and sensory activities which are required by all men. But, as every one who is accustomed to deal with children will agree, we must not be content with merely suppressing these undesirable tendencies. It seems, indeed, somewhat of an omission that Dr. Montessori speaks only of the necessity of rigorously "suppressing and destroying" such tendencies. It would be better to hint at transforming them. Our duty is but half done if we do not try to turn them into beneficial activities. Not merely to inhibit anger, or any undesirable spontaneity, but to divert the nervous energy into some useful or desirable channel, that is what the skilful attendant—parent, nurse, or teacher—always tries to do.[1] And with the very young, the outlet must be, in part at least, along a motor channel.

[1] Seldom, if ever, has the writer heard of a more striking instance of such skilful treatment than that of two little girls in a tenement house in Dublin, owned by a Social Service Society in Trinity College.

This is the very method and principle on which Dr. Montessori acts, although she does not state it here. Through sense and muscle training she gives full occupation; there is but a very small residuum of undesirable action left to be suppressed.

Looked at from this point of view, the so-called principle of liberty is no fetish; it does not depend on any theory of the abstract right of the child, nor on any illogical idea that it is the duty of the teacher not to interfere with the individuality of the pupil, or that Nature is endowed with such infallible wisdom that we are to leave everything to her. What is described as the principle of liberty is found, when examined from the physiological point of view, to be merely this—that as brain matter, or more generally all nervous matter, is organised by action, it should be the object of the educator, be he parent, guardian, or teacher, so to control the organisation of the pupil's brain matter that it shall be as effective as possible. How that object is to be best attained is no doubt a matter for observation, and, if possible, direct experiment. But since direct experiment in education is so often impossible, while observation of the results of this

One of the little inmates fell and hurt himself. The visitor, an undergraduate, herself a great adept with children, was on the point of taking him up and comforting him. But just as the rising pucker on his face gave notice of the coming torrent of tears, two little girls rushed up and cried to leave him to them. They had a toy horse and put it in his arms, telling him it was the horse that was hurt, not he himself, and that he must comfort it. So the pucker passed into a smile, as the little boy comforted the poor horse. Surely never was Christian Science better justified, whatever the stern moralist may say!

or that method involves a long delay, we must in the present imperfect state of our knowledge rely greatly on somewhat uncertain inferences from our knowledge of the laws of mental and physical growth, and for this purpose we must ransack all our stores—evolution, physiology, psychology, the experience of practical life, all these must be pressed into service. Thus we arrive at the belief that in regard to the development of the sensory and motor system it is important, in the early stages at least, to let the organism develop itself by means of its responses to an environment which encourages these responses to exhaust themselves in an orderly fashion, rather than one which counteracts them as soon as they are initiated—in which case we should lose control over the paths of their discharge and the resulting organisation of the brain. In regard to mental development, the same rule applies, though here the environment must be selected with even more care if we are to get the best results, because the inward impulses toward mental efficiency are by no means as vigorous as those toward physical well-being.

But in regard to social or moral development, the organism is not at all so satisfactory a guide, for in the history of the race, the social activities have not behind them the long and steady history of the others. Here we rely on authority for the standards of right and wrong action, of what is desirable and what is undesirable; and as the standard adopted necessarily depends to a large extent on the general attitude of the public mind toward the social problems with which it is confronted, the standard itself varies from country to

country as well as from century to century. Where there is so much instability in the aim, it is little wonder that the method is the subject of interminable dispute, and that we are compelled to rely upon our own opinion, and to enforce it by our own authority. No doubt this is always the case in the last resort, but here there is far less of external principle to guide us than in physical and mental education. But, on the other hand, we have greater stores of personal experience; and here, too, sympathy counts for far more than in the physical world. In regard, then, to moral education, Dr. Montessori speaks as an individual, not as the exponent of a principle which transcends individual experience. No doubt much of the delightful spirit manifested by her pupils is due to the harmonious relation between their natural impulses and their physical and mental environment, and in so far it is due to the application of the principle of liberty. But in the more distinctly moral sphere that principle is absolutely discarded. As we have seen (p. 191 and elsewhere), Dr. Montessori does not hesitate to suppress and destroy with absolute rigour the free impulses of the children towards doing anything that she thinks they ought not to do; the rigour, indeed, only relates to the result; her methods of suppressing them are clearly based on loving sympathy and on reverence for the child; and, as always, the ways of children so treated are charming.

But are we to conclude that that method is the best which results in the highest type of childish behaviour—in sweet-tempered, courteous, bright, happy,

truthful, fearless, and confiding children? Can we be sure that here the child is the father of the man; that such children will develop into men and women with equally fine characters? If so, the immediate results of Dr. Montessori's own method of training are a sufficient justification of the method—which is, indeed, that of many strong and sympathetic teachers and mothers. Unfortunately this conclusion is not certain; it is quite possible that to train children to be very good children may not be the way to make them good men and women. Spencer urges this view. "Already," he says, "most people recognise the detrimental results of intellectual precocity; but there remains to be recognised the fact that *moral precocity* also has detrimental results. Our higher moral faculties, like our higher intellectual ones, are comparatively complex. By consequence both are comparatively late in their evolution. And with the one as with the other, an early activity produced by stimulation will be at the expense of the future character. Hence the not uncommon anomaly that those who during childhood were models of juvenile goodness, by and by undergo a seemingly inexplicable change for the worse, and end by being not above but below par; while relatively exemplary men are often the issue of a childhood by no means promising" (*Education*, chap. iii.).

Here it is no question of turning children into prigs or hypocrites—that only happens through influences easily seen to be injurious. The danger now contemplated may arise even when children are brought

up under the finest influences and by worthy and broadminded people. It is rather the question of how far the moral character which belongs to the highest stages of civilisation can be well and truly built upon any other foundation than that of the imperfect characters of the earlier stages of the race history. It is not only to the mental world that the theory of culture epochs applies. We see it also in the moral world. The tendencies which Dr. Montessori would rigorously suppress are survivals from the past. Are we to suppress them in the child, or are we to rely in part on the child growing out of them, after the analogy of our other educational methods? No one who desired to produce a good business man would endeavour to suppress in the child all tendencies except those which appeared to lead directly towards the business habits of the adult; we all recognise that a business man so educated would be but a poor specimen. Yet in morals this is what we are apt to do—we desire to uproot evil in our children as early and as completely as possible.

The physiological analogy may help to make the point clearer. According to the biogenetic law referred to in the note p. 83, the organs of the human embryo pass through many of the stages which belong to the lower orders of life. If, unaware that this was the regular course of development, we were to watch its growth, we should be horrified to see one pre-human attribute after another making its appearance. For example, the human lungs are developed out of what, in the embryo, promises to become the gills of a fish.

Fearful lest our embryo should develop into a mermaid, we might desire to excise the gills; but those whose ignorance was less than ours would tell us that by doing so we should deprive the embryo of the very material out of which the human lung must be developed. Does the same principle apply to the growth of the moral nature in the child? Spencer, with his customary dogmatism, confidently asserts the parallel. It may be wiser merely to put it forward as a suggestion for careful consideration—a serious warning against dangers far more obscure than those of turning children into prigs or hypocrites. In particular, it may help to prevent juvenile delinquencies being taken too seriously. What appears as an enormity to the anxious parent is no doubt, in many cases, but a passing phase in the child.

Stress has been laid on the importance of sympathy and reverence in the teachers. Of scarce less importance is a saving sense of humour. With it, and with wholesome children not too much repressed to reveal their desires, we need not greatly fear. "Mother," said a little girl of whom the writer knew, and who, alas! was being far too carefully brought up, and for another—but not to her a better—world—"mother, do you think that if I were to be *very* good and sing with the little angels *all* the morning, God would let me play with the little devils in the afternoon?" From that artless request, preferred in all simplicity, the well-meaning mother learned much. And if any, reading it in these pages, are shocked at its seeming irreverence, they, too, have much to learn.

CHAPTER VII

THE MONTESSORI SCHOOL AND APPARATUS

1. *General Characteristics*

THERE are striking contrasts between the Montessori concept of a school and that of other educational systems, alike in regard to the teacher, the curriculum, the time-table, and the schoolroom. These differences all spring from the extraordinarily logical way in which Dr. Montessori has applied to the child's physical and intellectual education the principle that education must be based on the child's own spontaneity—that he must be allowed to build up his own mind after the pattern that its natural development craves for. In fact, the teacher's duty is almost confined to securing for the child the opportunity of satisfying his spontaneous tendency towards well-ordered activities.

We see then that the method follows the Froebelian analogy, in which the child is likened to a plant, while the teacher is a gardener who merely supplies ideal conditions for the healthy natural growth of the plant—not the Herbartian analogy, in which the gardener would determine the character of the plant—

whether, for example, it shall be prolific in flowers or in foliage. For in the Herbartian philosophy it is the especial function of the teacher to control the growth of the pupil's mind—to build it up according to the pattern he himself approves, the very antithesis of the Froebelian principle of self-development.

It is to be hoped that no reader will rest satisfied with paragraphs such as the above, which have the inherent faults of the common popular discussions on education. "Natural development," "healthy natural growth," what do such expressions mean? As they stand, they mean little more than that their author is begging the question. They acquire a real meaning only when we know *in detail* what is meant by the expressions. For, logically, the Herbartian is right—in so far as the teacher arranges the environment, he *does* control the character of the resulting development. In truth, then, the teacher's responsibility, in the one system as in the other, is to provide the most suitable environment. Thus the principles of competing methods must be judged, not by loose general descriptions, but by a close examination of the details by which they are worked out. In the previous chapters there have been several detailed examples of what the principle of spontaneity and natural development means in the Montessori system. It is only when we take such examples as affording a definition of the meaning of "natural development" that we shall be logically right in saying that in her

system we follow the order of the natural development of the child's mind.

The reason for introducing this discussion just at this stage is that we shall presently have to regard Dr. Montessori as a thoroughgoing Herbartian—a teacher who consciously endeavours to control the growth of her pupils' minds far more completely than would usually be permitted by parents. It is only in the physical and intellectual worlds that she puts the principle of freedom or non-interference into practice. In the moral world she would dominate not only their behaviour, but their thoughts. She is a social as well as an educational reformer, and she has a very clear idea of the moral character she desires to produce in her children. To attain her end she neglects no means known to those who love little children, and who recognise that character in the very little ones is to be formed by gentle influences which unconsciously create a sense for ethical beauty, rather than by direct instruction in our duties to ourselves and our neighbours. To this end she becomes their confidant; by conversations which appear to be but a part of the routine of the school she enters into their little world as completely as the gentlest of mother confessors. With no feeling of compulsion on their part, she leads them to open their whole souls to her, that she may mould them as she will. And being herself one of the great company of strong, pure, and devoted women who, imbued with a deeply religious spirit, are possessed by a reverent love of children, she moulds them very beautifully, as all observers tell us. So do all such

women—could we but fill our infant schools with them, and let the school hours last from the morning to the evening, as in her school of which we read; could we but provide that, as in her school, the mothers should look on the teachers as the kindest and wisest friends their children could have, and thus co-operate with them in every way; then, whatever the intellectual results might be, we should at least have sweet-tempered, sweet-faced, and sweet-voiced children, neither forward nor shy. But whether it is wise to allow such an intimate relation between the average teacher and the average pupil is quite another question, not only because we cannot secure that all teachers shall be worthy of so great a responsibility, but also because it involves questions of parental responsibility. In Dr. Montessori's case the parents gladly gave to her all the authority she desired.

Little more need be said on this matter, except to give, in section 3 of this chapter, a description of her morning conversations with the children; for it will be seen that although Dr. Montessori probably regards it as an essential part of her own practice, it is quite separable from the physiological principles which are usually supposed to constitute the essence of the system, and which, indeed, Dr. Montessori at times seems to claim as its sole foundation.

We may say, then, that except in regard to moral education, the Montessori teacher, having secured that the child is placed in a suitable environment, is rather a helper than a teacher, and she will usually postpone her help far beyond the time when an

ordinary teacher would assist—the method is in that sense "heuristic" in the extreme, but the problems set are child-problems, such as he can easily solve.

As to curriculum, there is just that amount of regulation which gently suggests the possibility of several activities to the child, but lets him select for himself among them.

As to time-table, we shall see that there is a time-table of a very general character, but there is nothing whatever of the cast-iron rigidity of the ordinary school hours.

These differences imply corresponding differences in the physical arrangements of the schoolroom—the first, and perhaps the most characteristic and far-reaching, is that there are no fixed chairs or desks, but instead, little chairs and tables which the children can easily move about so as to place them wherever they choose. Also, the door of the schoolroom is always open, so that the children can get into the garden whenever they like to.

As to punishments, it appears that in the great majority of cases the refractory children were found to require medical treatment. Where that was not the case, the punishment used was to seat the offender, caress him, and supply him with toys. It appears that he soon tired of this spoon-feeding and desired to be at work with the other children. The change in the behaviour of the children, Dr. Montessori tell us, was surprisingly rapid and lasting.

Except for some common games, like marching and

the games of silence, described later, there are no class lessons except in gymnastics; each child selects what he is to do, or at least he feels as if he selected it,

FIG. 3.

though the real selection is, no doubt, often in the hands of the skilled teacher.

The apparatus of a Montessori school, as designed or adapted by the originator, may be roughly divided into hygienic and didactic, according as the primary intention is to develop the body or the mind.

2. *Hygienic Apparatus and Training*

A healthy little child is naturally active, and the best way to develop his body is to give full scope to his natural activities. For this purpose very little apparatus is needed, but whatever there is ought to be such as to encourage the exercise of those activities, not to impede them. It is for this reason that, as we have already seen, fixed desks and chairs are not permitted; instead, there are light chairs and tables which form part of the gymnastic apparatus—to move them about noiselessly is one of the exercises by which the children acquire control over their muscles. Also, because the light articles are very easily overturned, they learn not to push against them as they thread their way through them.

In considering the kinds of exercises most suitable for very young children, the chief point to bear in mind is that in the earlier years the arms are relatively very strong and the legs relatively very weak, so that there ought to be much more opportunity than is usually provided for exercising the arms. It is hard to realise the extraordinary strength and endurance of the child's arms, but any one who, holding a child's hands in his own, has swung it round so quickly that its feet leave the ground, will get some idea of how much the child enjoys a great strain on the arms.[1] But he will never in that way get any idea of how long the strain can be supported, for he will tire long before

[1] When the feet leave the ground the strain is of necessity greater than the child's weight.

the child. An instance within the writer's experience may give some idea. He and some young men were walking over rough ground with a little girl of about five. She demanded to be swung off the ground, and so carried along, one man taking one hand and another the other. Fresh relays of men were required, and the game was carried on for more than half a mile, when the men gave up, and all this time the child clamoured to be swung to and fro. This may be more than most children of the same age would enjoy; but if so, it is only because their arms have not been exercised as continuously as those of the child in question, who was accustomed to be pulled about almost as much as she desired.

It is interesting to observe that the exercises of the arms which the child enjoys are those in which the *weight* is supported by the arms instead of by the legs—mere exercise of the arms is not enjoyed at all so much. The reason is plain. Such exercise serves a twofold purpose. The great amount of energy expended by the arms serves to increase the circulation and keep the body in good order, and, in addition, the legs are relieved from a strain which they are as yet scarcely adapted to bear—one which often injures them, making the child bow-legged. Those in charge of little children hardly ever provide enough opportunities for exercising the arms—it is only in later years that the boy, wanting to be strong, begins to train the muscles of the arms in order to restore a power which has been lost through early neglect. Dr. Montessori is no exception; her idea is not to afford the opportunity for spontaneous

exercise of the arms, but to take some of the weight off the legs. There appears to be only one means provided for putting a strain on the arms—a bit of paling which they can climb along from one end to the other. This she introduced from happening to see—as who has not ?—some of the children making this unexpected use of a fence, and with great enjoyment. (Those who live in towns may see the banisters used in the same way.) Being a spontaneous exercise, it was, on her principles, one which she was bound to encourage, and she approves it because it relieves the legs. The instance shows how desirable it is that such matters should not be left to mere chance,—had the fence been a wall, even this degree of adaptation to the child's spontaneous desire for exercise might not have been thought of—physiological observation and deduction are necessary to make sufficient provision for such an activity.

The Montessori apparatus is as follows :—A couple of parallel bars are suitably supported along the length of the nursery or playroom, one for the feet and one for the hands, and are placed so as to leave room for the children between it and the wall. Thus they are able to enjoy looking at what their companions are doing while they are climbing along it, and they will naturally go to it when their legs are getting a little tired.[1]

[1] Climbing by the arms is one of the most natural exercises of children in early years, but it is difficult to prevent injury from falls. One arrangement which would get over this is to support a ladder horizontally above the floor, so that the children could pass

Dr. Montessori is very wise in giving her children a special course of respiratory gymnastics as part of the school curriculum. If all adults breathed properly, children might learn to breath properly by nature and by mere unconscious imitation; as it is they do not. Medical men who have studied the subject know well the immense importance of breathing in such a way as to exercise the whole of the lungs. When they see a narrow-chested or a flat-chested man or woman, they know two things—first, that there is a much stronger probability of consumption and other diseases of the chest, and second, that the defect is not congenital—that though some have naturally less chest capacity than others, there is no chest which cannot be properly developed by exercise in the years preceding adolescence.[1] Dr. Montessori gives one

along hand over hand from rung to rung with their feet just off the ground. A horizontal bar at a sufficient height would serve the same purpose in a slightly different way. Falls, if they occur, will be harmless here, the height will be so small. When the children climb to considerable heights, mattresses or stretched sheets may be placed below, but this is not always easy to arrange for; where sand is available it affords an excellent protection, and the children may climb to greater heights. It seems, however, unnecessary to suggest detailed means for climbing, as most of those who are capable of looking after such apparatus will be able to devise what is suited to the special circumstances of their own nursery or school.

[1] It is remarkable how little attention is given to this subject not only in nurseries and schools, but even in books written by medical men. In Dr. Drummond's excellent little book on *The Child*, the importance of proper breathing is recognised; but the only suggestions as to how to attain it are, first, that the clothing should leave girls freedom to breathe, and second, that the children should sing and read aloud. There is no suggestion of teaching *how* to read aloud; and as few adults read well, most children,

example only of a respiratory exercise, and as it is one in which the mouth is open, a warning is necessary, for it is very important that children should get into the habit of breathing through the nose and with the mouth shut. In connection with these exercises, Dr. Montessori *teaches* the positions of the organs in speech; and she tells us that these exercises are to be done in class in the first instance, though the children should be tested individually at the conclusion, and even directs the teacher to take hold of the child's tongue and put it in the proper position against the teeth, if necessary. This seems a somewhat repulsive practice, and, especially when done in class, not at all defensible on hygienic grounds; infection may be carried from one child to another, even if the teacher's fingers are themselves quite clean. The children, too, might imitate it, which would be an unmixed evil.

The importance to the adult of proper breathing

imitating bad models, read badly—badly in regard to articulation and breathing, as well as in regard to expression.

To measure chest capacity, fill a large bottle with water, and invert it over a basin with just enough water to cover its neck. After taking as deep a breath as possible, the child blows into a rubber tube which passes into the inverted neck of the bottle, forcing out the water until he can blow no longer. He and his companions are interested to see the air he expels from his lungs rising in the bottle. Its volume may be taken as the measure of the chest capacity.

A rougher method is to blow into a bladder or football.

The provision and periodical use of such an apparatus in schools would, in connection with respiratory gymnastics, do more to improve the physique of the nation than any other single means.

cannot be overestimated. Large chest capacity is by far the most important bodily trait under our control—there is no other to which medical men attach a tithe of its importance. All that is necessary to secure it is a proper habit in breathing. Even if this habit be not acquired in early years, practice at any age, but especially during adolescence, is of the greatest use.

Beyond these special gymnastic exercises, all those games and occupations in which children delight are to be regarded as included in the curriculum of a Montessori school—marching to music, games with balls, hoops, bean bags, swings, kites, the games of Froebel, gardening, care of animals, plastic work, and so forth. It would obviously be impossible to go into these matters in detail. Each teacher or parent must decide for himself how far he can use these well-known means.

3. *The Montessori Curriculum and Educational Apparatus*

Before describing the technique of the Montessori teacher at length, it will be convenient to describe the curriculum and the apparatus, called the *didactic material,* a combination of words which seems to the writer rather too redolent of a mechanical routine It appears, too, somewhat inconsistent that of those who refuse to adopt the conception of teaching and who therefore substitute directress for teacher (a change not adopted herein), should reintroduce it in the

adjective applied to the material. For the Montessori idea is that of *auto*-education—it is the child who teaches himself.

When the children first arrive at the school they are carefully inspected. Hands, nails, neck, ears, face and teeth, all these are examined to see if they are clean; is the hair tidy? are the clothes torn or dirty or wanting buttons? are the shoes clean? Whatever fault there be, the child's attention is called to it. Thus they become accustomed to the care of their own persons; and they are carefully taught how to wash the different parts of their bodies, with especial care for the washing of the eyes, ears, and teeth, and the rinsing of the mouth. In the course of this teaching, the reasons why water alone is used for the eyes, soap for the hands, and so on, are clearly explained. The older children are also taught to help the younger. Dr. Montessori thinks it well that the mothers should be present during the inspection of the children, but as spectators only.

When this is done the children put on their school aprons, helping each other when necessary, and the inspection of the schoolroom begins—the apparatus is looked over to see if it is clean, the children are shown how to use dusters and brushes, and how to get the dust out of corners, etc. Then the teacher "explains" to them that the "normal position" is for each child to sit in his own chair, with his hands on the table, his feet together on the floor, and his head erect. All that is to be done quickly and quietly. "In this way she *teaches* them poise and equilibrium." Then she

tells [1] them to rise while they sing the hymn. Next comes a series of exercises in which they learn to move quietly, quickly, and gracefully, and without knocking against the furniture; and they are taught to salute each other, to lift things up and set them down with great care, and to present objects to each other nicely, and to receive them politely. The teacher meanwhile has her eyes everywhere, with a little word of public approval for whatever is well done ("she calls attention, with little exclamations, to a child who is clean," etc.), and of correction or explanation for what is ill done.

When the teacher has in this way got the children to observe themselves and to "take an interest in their own appearance" and behaviour, she gets them into conversation with her about how they have behaved in the interval since leaving school. These conversations, as sketched by Dr. Montessori, go into the details of the child's life in the most practical and excellent way—they are questioned not only on their games and their attitude to their parents, but on such matters as whether they were able to go upstairs without leaving mud behind them, whether they were polite to friends who passed in the street, helpful to their family, whether they told about what

[1] The critic whose help I have elsewhere acknowledged observes that *tells* them is "not Montessori language." That is true, but since this is part of ordinary school drill, conducted in the way any good modern teacher who was suited to deal with little children would conduct it, it seemed well to call attention to this fact by using the ordinary language. "Has them rise" is the language of "*The Montessori Method*."

they had learned in school, what they ate, what happened at any little parties they were at, and so on. This is all to be done with great discretion; the children are not encouraged to report such family matters as ought to be kept private, nor gossip about other families, but only to converse on matters "which it is desirable to talk about."

It is quite true, as Dr. Montessori says, that such conversations are of great educational value. But while nothing could be of greater value when in the hands of a teacher of the highest personal qualities, it is equally true that, in the hands of an unsuitable or unscrupulous teacher, no practice could be more dangerous.

The Grades.

Although the spontaneity of the child is the guiding principle of the curriculum, yet experience seems to have shown that within certain limits the development of the Italian children's interest in the apparatus used follows certain tolerably well-defined laws, so that something very like a curriculum can be followed.

It appears that at the beginning of Dr. Montessori's work with normal children, she established a schedule of hours of lessons in which the whole day was mapped out, just as in an ordinary school. Experience, however, showed that a routine of occupations could not be maintained in a school founded on the freedom of the pupils, except as regards the lessons in care of the

person and in social behaviour, which are always taken on the pupils' arrival at the school.

Although it has been judged most convenient to describe the "didactic material" in the sequence which Dr. Montessori's later experience led her to lay down, yet it would be a serious mistake to look on these "grades" as defining hard-and-fast lines between the sequences of the spontaneous activities. Just as the culture epochs are variable, so are these activities; they will vary both with the child and the teacher, for it is impossible but that the child will be influenced by what is in the mind of the teacher. Thus the arrangement of the exercises in grades is to be taken only as a general indication of what was found desirable with Italian children. Indeed, even with that restriction, care has to be taken in interpreting the divisions indicated by the grades, *e.g.* the division of the teaching of writing and reading between the fourth and fifth grades. For while all the exercises preparatory to writing are given as part of the fourth-grade work, the spontaneous writing of words and phrases is put under the succeeding grade. Yet, as we have seen, it is unwise to postpone the latter for more than a week or so after the preparatory exercises are even partially completed (see p. 138). Above all, the teacher should not regard the grades as being of necessity school years, although the word itself and the fact that there are five grades, one for each of the ages, —two to seven,—to which the curriculum applies, might naturally suggest this interpretation.

The truth is that the teacher must judge by experi-

ence—experience founded on the observation of the pupils in conditions which favour the spontaneous revelation of their natural activities. Any attempt on the part of one teacher to force the children under her charge to conform to the experience of other teachers with other children would be a serious violation of the fundamental principle on which Dr. Montessori's success has been founded.

With this reservation the educational apparatus is here described in the order finally given by Dr. Montessori.

It is also to be remembered that all the grades are being worked through by the children in the same room and at the same time, and that a child may, at his own will, change from one grade to another. Thus the arrangement of the curriculum in grades should be regarded only as indicating the general way in which the activities are likely to develop when the child is taught according to the method of freedom; they suggest to the teacher the order in which the material should be suggested to the child. For the Montessori conception of the freedom of the child should not be held to mean that he is to receive no guidance from the experience of the teacher. Such an interpretation is at once negatived; his freedom to choose is of necessity limited by the fact that even the didactic material is not unlimited. What is of importance is that he should have a sufficient choice of suitable material to feel that he chooses freely—that the suggestion of the teacher should not appear to him as a limitation of his freedom (see pp. 234–5).

As soon as the child comes to the school, he is given the exercises in quiet and graceful movement already described, especially those of moving the seats in silence.

Fig. 4 shows how a chair should be put down.

Fig. 4.—Putting the Chair down quietly.

Observe that the child is looking at the ends of the legs. The pair of legs near to the child goes down first, but only one at a time. (We see by the shadow that the chair is still tilted, though unluckily the shadow only gives the effect in regard to one of the

two legs away from the child.) Then the remaining pair is put down. Observe, too, the small size of the chair; being so small it makes the children look bigger, an observation which applies to all the illustrations.

Then he is given a series of exercises in buttoning, tying, lacing, etc. These exercises should be chosen so as to afford practice as nearly as may be in what the children have to do when they dress themselves or their little brothers and sisters.

Fig. 5 shows the set of frames as supplied by Messrs. Philip & Tacey. It consists of eight wooden frames with which the children can practise :—(1) Buttoning linen; (2) lacing corsets; (3) ribbon bow tying; (4) buttoning corsets; (5) patent snap fastenings; (6) buttoning leggings; (7) lacing leather; (8) hook and eye fastening.

The children generally take delight in these exercises, and will sit round a table hard at work upon them for a length of time. Fig. 2 (p. 181) shows how absorbing this work may become. Considered physiologically as a means of organising the nervous system, the chief function of this exercise is to teach the co-ordination of the sensory and motor nerves controlling the hand and fingers, and it also gives practice in the simpler correlations of eye and hand.

The children in this first stage are also given more definite training in visual and tactile experiences. There are three sets of cylinders whose dimensions vary according to a regular scale, and each set fits into corresponding apertures in a stand, like the weights

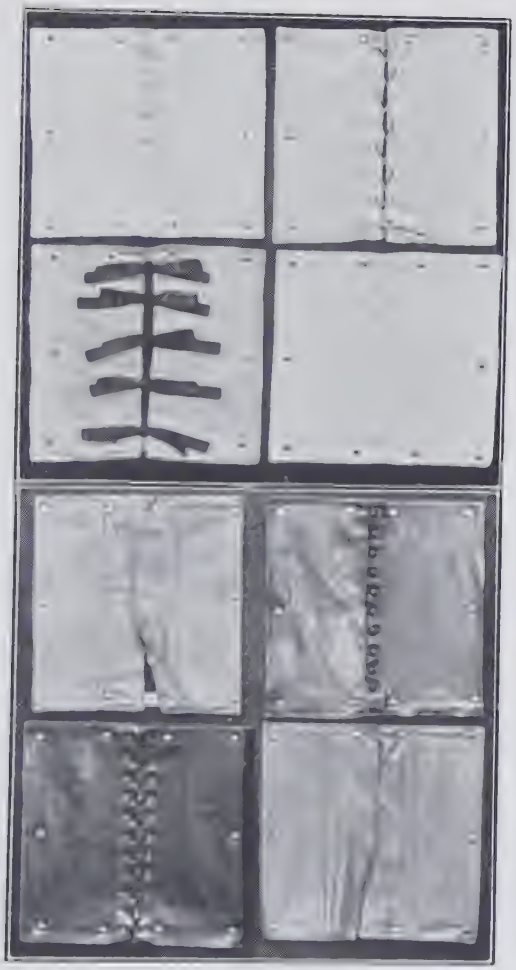

FIG. 5.

in a chemical balance. These are scattered about on the little table, and the child has to pick out by sight the different sizes, and match them to the holes. When he is a little more accustomed to it, he has to pick them out *in order*, to pick the smallest from the heap and put it in its place, then the next, and so on. When still more advanced the cylinders are scattered further apart and at a greater distance from the stand, so that he has to remember for a still longer time which he wants next, and has to make a still greater allowance for the effect of greater distance in diminishing the apparent size of objects. When he is able to do this easily, he is ready to move to the next grade; and if he uses the cylinders in it, they may be scattered on the floor.

The order of gradation from easier to more difficult in the cylinders depends on the nature of the variations in size. The first and easiest set—shown as the upper one in Fig. 6—is that in which the cylinders are of equal height but of varying diameters.

In the second set—shown as the lowest in the figure—the cylinders vary both in diameter and height.

In the third and most difficult set—the central one in the figure—the cylinders are of equal diameters but varying heights.

(The fact that in both the British and American illustrated catalogues of the didactic material the order of the cylindrical blocks should be interchanged, affords an excellent example of adult misunderstanding of the nature of the child. It is easier to the adult to describe sets of cylinders in which only one dimension

varies at a time, than those in which both dimensions vary, therefore he regards this as the "natural"

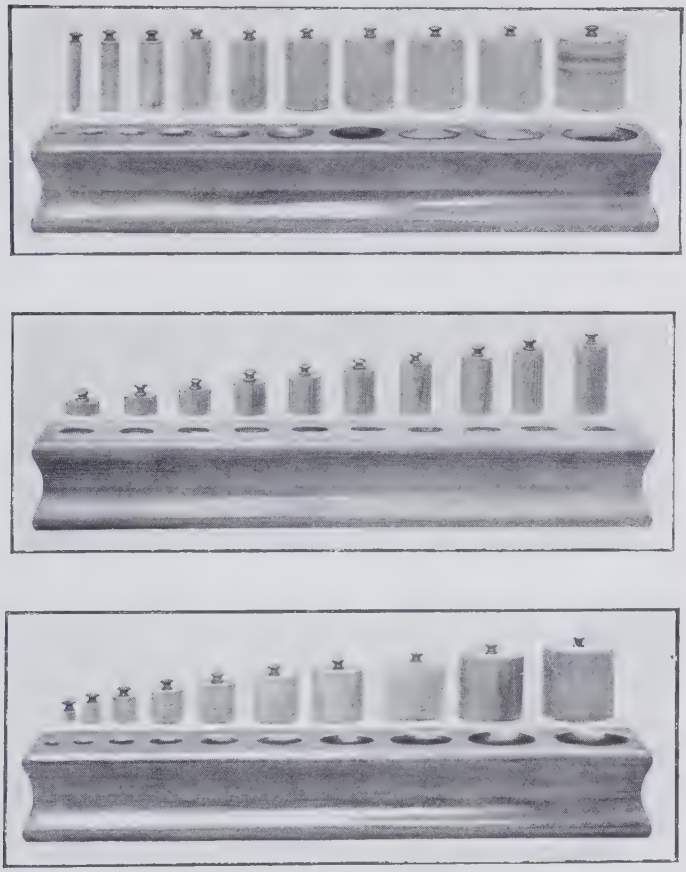

FIG. 6.

order of difficulty. No doubt the order in the figure is the simplest from the point of view of definition; but definition implies abstraction, and the child's mind does not work like that of the educated adult. If it did, there would be little need for education.)

In the Italian schools the height of the cylinders of the first set is 55 mm. (2·2 in.) high, and the largest is 55 mm. diameter, each cylinder being 5 mm. (0·4 in.) wider than the preceding one.

In the second set the largest cylinder is the same size as in the first, but now the cylinders decrease by 5 mm. each way.

In the third set, all the cylinders are of equal thickness, *i.e.* half that of the largest cylinders of the other sets, and they decrease in height as in the second set.

These comprise all the exercises in the first grade.

It is no small part of the advantage of apparatus designed on the model of the cylinders that the apparatus itself supplies a "control." For example, if in the first or second set the child should try to fit a cylinder into a wrong hole, it will either not fit at all, or will fit too loosely. In the first case he at once discovers his mistake; in the second, if he does not observe that the cylinder fits too loosely, he will of necessity find out the mistake as he tries to fit the remaining cylinders.

Thus the apparatus itself tells the pupil of his mistake; no intelligence is needed on his part to find that he is wrong; intelligence only comes in when he

tries to remedy his error. Thus there is no correction by a teacher.

In the third set of cylinders the control is not of this mechanical character. The cylinders can be fitted

FIG. 7.

in the wrong places just as well as in the right ones. The control here rests with the pupil—it is his eye which tells him that some of the cylinders are misplaced. This is the reason why this set of cylinders is, to the child, the most difficult of the three.

Figs. 7, 8, and 9 show a child engaged in putting this set of cylinders in place. In Fig. 7 everything is going on satisfactorily. In Fig. 8 it is clear that there has been some miscalculation which is being

FIG. 8.

remedied in Fig. 9. The features show plainly enough that a problem is being attacked — that real mental work is being done.

It may happen that after a time the children will

play with the cylinders in their own fashion, instead of putting them into their places, *e.g.* using them as wheels, or as pistons (and similarly for any of the other material). If a child is *absorbed* in the new play, then

Fig. 9.

let it continue. If, however, the interest in it is fitful, intermittent, then do not offer that material next day—see if the child will not choose something else. Nor should the choice be confined to the Montessori material. The Froebelian gifts will often fill a want—

they are, as we have seen, part of the equipment used by Dr. Montessori.

In all the grades, and with all the material, the test is the same—if the child's interest in his occupation is a continuing one, if he remains absorbed in it, then it is truly educative, and is forming his character as well as developing his mental power and training his muscular control.[1]

If, on the other hand, the interest is fitful and wavering, then, as we have seen in the last chapter, the material is not as suitable as it should be, and the skill of the teacher will be shown by the success with which she suggests another occupation—the suggestion being implicit rather than explicit. The stress laid by Dr. Montessori on the need for observing the child has its application, nay, its sole application, here. If we were not to aid the children to choose their occupations, if we were not to secure that these occupations were changed when they were no longer effective educationally, why should we observe them at all? And as this work of direction should not prevent the children from feeling that they are acting from their own inner impulse, the Montessori teacher must study her pupils much more closely than the teacher who puts her faith in training the children to be obedient to commands rather than in letting them develop through their own spontaneities. Because there is an environment, we have seen that, in strict

[1] This is indeed true even of an undesirable occupation, such as pulling insects' legs off; the objection is that, besides hurting the insects, it tends to form character in an undesirable way.

logic, the pupil cannot be really *free*. What is important is, that he shall feel himself free, that he shall not feel himself *hampered* in his choice. It is therefore the duty of the teachers to secure that the environment shall generate this feeling of freedom, and shall at the same time lead to self-development in the directions we approve. And if the child invents a new occupation of his own for any material, then if it be an absorbing one and not inherently undesirable, by all means let him continue it (see, however, p. 291).

When the child is familiar with the cylinders, they are used for teaching the meaning of the words *thick* and *thin*, *long* and *short*, *large* and *small*. Dr. Montessori lays the greatest stress on the necessity of teaching an accurate nomenclature. This is always done in accordance with the three periods of Séguin, as described in pp. 132-4, and without revealing the error to the child if he makes one. The lesson is commenced by showing the *thickest* and the *thinnest*, side by side, contrast being always used as effectively as possible. When this has been learned, *thicker* and *thinner* are taught, and the child's understanding is tested in the routine way—"give me the thicker," or the thinner, as the case may be. (Observe that only two contrasted qualities are to be taught at the same time—it would be quite a wrong practice to commence with the cylinders which vary in both directions, and say, "This is the shortest *and* thinnest; this is the longest *and* thickest.")

When the child is taught the meanings of such words, the object is to create a strong association between the object and the word. Hence the word should be repeated *very clearly*, while the object is shown to the pupil in such a way that the physical quality which appeals to him is, as far as possible, that corresponding to the name—thus, when *heavy* and *light* are being taught, the pupil should weigh the objects by the hand.

Again, no superfluous words should be used; they would distract the attention of the pupil from the words on which it ought to be fixed.

This method of teaching the meaning of words is in striking contrast to that of nature. The child naturally picks up language in a very gradual and uncertain way. He hears others using words of whose meanings he has no conception. He invents meanings for them, because he often recognises the general effect of a sentence, although he does not know the meanings of the words which compose it. It is with him largely a case of learning by eliminating erroneous meanings, one after another. This is inevitable in regard to abstract words, but it has many disadvantages; for words are good servants but bad masters, and we are, all of us, very liable to be misled by them. It is therefore of especial importance that, whenever possible, we shall attach clear and definite meanings to the words we use. This will at least give us an ideal of clearness, and thus help to prevent our thoughts being controlled by verbal misconceptions.

In direct contrast to the Herbartian method of the

formal steps, the application is not suggested by the teacher. Having explained very clearly the meaning of, *e.g.*, big and little, the teacher leaves it there. She does not apply them to other objects ; it would be contrary to Dr. Montessori's conception of the principle of freedom for the teacher to point out that she is big and the child little. When the child's own experience calls for the application, the child will make it spontaneously. To encourage the child to make it before his own experience demands expression in that form would be to interfere unnecessarily with the principle of self-development.

All such statements as the above should be examined critically by the teacher. What is the justification for the assertion that such interference is unnecessary ? The justification is only to be found in results. The only final proof of the pudding is in the eating. One of the great services Dr. Montessori has performed for education is to show that this waiting attitude of the teacher does not in fact lead to slower development than the hurrying attitude of those who lead the child to make the application at once. When the time comes for the child to make the applications himself, he does so with a fulness of knowledge and experience, and with a sense of achievement and power, altogether lacking in the child who is led by the teacher's hand. Moreover, the child so taught is developing a tendency to rely on himself—to observe for himself, to draw mental inference from the material supplied by his senses. Nor is that the only advantage, perhaps it is not even the chief advantage. For

the child so treated reveals clearly to the teacher the mental progress he is making. In the other method, the teacher is almost certain to over-estimate the rate of progress of the bright and responsive pupil, and to under-estimate that of the pupil who thinks less rapidly but more surely. The result is doubly disastrous. The child who thinks by sympathy, as it were, who accepts without question what the teacher wants him to see, expects him to see—that is the child who needs to be kept back, to be made go slow. Yet in the ordinary method of teaching, that is the very child who is sure to be taught too fast for real knowledge. On the other hand, the child who does not respond quickly to the suggestion of another mind, the one who gathers up his own experience slowly but surely, he is discouraged. The sound working of his mind is interfered with; he may be set down as stupid, and may easily be made really stupid, if he is not allowed to finish the processes by which his mind is educating itself. These are very real difficulties. Even the most practised teacher will make mistakes in one direction or the other, and probably in both directions, if he follows the ordinary method. The pupils who naturally hurry on too quickly will be allowed to hurry too much, while others whose minds naturally work more thoroughly will be discouraged, as well as prevented from working slowly and surely.

The actual degree of interference with the principle of self-development is a matter for experience and judgment. If the child is "defective," still more if he is idiotic, self-development will not be satisfactory

or possible; the child will never rise to the normal standard, he is more passive and must be *taught.*

Games of Silence

Common to all the children of the School, and therefore belonging to the first as to all the grades, there are games of silence. The teacher begins by offering herself as an example of perfect silence. Sitting in her chair—as the children are themselves sitting, she should sit—she calls attention to the different parts of her body, to show how still they are—"See my feet, can you keep yours quite, quite still? Do you hear my breath?" and so on. Then she may rise from her chair and ask them to watch how silently she does it. She walks on tiptoe with scarcely a sound. In encouraging the children to be silent it will be well that she awaken imitation. She may ask them if they can be as quiet as a little mouse? or, in winter, "Who can be as silent as the snowflake?" Then she calls a child to her, and, while the class watches, she asks him to be as silent as she is, and to listen for the little noises he makes even when he thinks he is quite still. Thus they learn that there are degrees of silence, and as the whole class strives to imitate her, she calls attention to this or that little movement of a child here or there, by which the silence is broken. In that way "the attention of the child is called to every part of his body in an anxious effort to attain to immobility." When silence is established, there is heard the ticking of the clock, or the sound of distant voices, or

steps passing outside. "The children sit fascinated by the silence, as if by some conquest of their own. 'Here,' says the directress, 'here there is no longer anyone; the children have all gone away.'"

This silence is a new thing to the children; they have made it themselves, and they delight in it; striving to make it absolute, they learn a new self-control, and find a new power. To heighten the effect, Dr. Montessori has the room darkened; then, telling the children to close their eyes, she goes into a room behind them. "Now listen," she says, "a soft voice is going to call your name." So each child waits in silent expectation for the voice which shall call him, and then, with joy and opened eyes, but still with the utmost quietness, tiptoes across the room to the calling voice. The children take pleasure in the *silence itself* as well as in being called. They seem to realise that they have won a victory over themselves; even children of three years have remained immovable in the silence during the long period required for calling forty children from the room.[1] "It was then," writes Dr. Montessori, "that I learned that the soul of the child has its own reward, its own peculiar pleasures. It seemed to me that the children came closer to me, more obedient, more gentle and sweet. We had indeed been isolated from the world, and had

[1] Observe that it is because the impulse to silence springs from the children themselves that they can remain silent and motionless far longer than they could from the external command, "Be quiet!" —which the Montessori teacher would never use—and with no tendency to emotional disorder such as follows the endeavour to control themselves through fear of the teacher's displeasure.

passed several minutes during which the communion between us was very close, I wishing for them and calling to them, and they receiving in the perfect silence the voice which was directed personally toward each one of them, crowning each in turn with happiness." [1]

Later, this " making of the silence " is a prelude for many games, especially those of carrying out written directions, and it forms the fitting preparation to lessons in musical sounds. Dr. Montessori rightly holds that sweet and soft musical notes should be heard and listened to by the children with attention and with pleasure, before they themselves are invited to sing—their own singing should come as an imitation, a response, an expression of the music which has been awakened in them through hearing music.

The *Story* is not included in the curriculum given in Dr. Montessori's book. There is, however, no reason why it should not be included, with this condition, that, if the children are not interested in the story, they must be free to leave the listening circle and do something else. For it would be contrary to the Montessori principle to *require* the children to attend to the story when they desired to do something else. It is understood that it was because the children with

[1] In connection with this beautiful description, it is interesting to observe that as it is through the sense of hearing that human interests and sympathy chiefly manifest themselves, so there is anatomical evidence to show that the ear is the last of the sense organs to develop, as well in the individual as in the evolution of animal life.

Silence which can be heard has indeed a very special effect on the mind, one which can be obtained in no other way.

whom she experimented did not choose to listen, but went about other occupations, that Dr. Montessori did not include the story.[1] But whatever may be the

FIG. 10.—The story in the Montessori School at Runton Old Hall.

explanation of the omission, the Montessori principle requires that other teachers shall not blindly follow

[1] Yet from the account previously given, pp. 143-4, it would seem that in one case at least she attributed the want of interest in the story to the fact that the children did not understand the meaning of the words used in telling the story, thus implying that she believed they would be interested in a story they could understand.

her lead, but shall, in the first instance at all events, let the children choose freely for themselves.[1]

Granted that there are to be stories, are they to be matter-of-fact stories, or are fairy stories permissible? Here, again, let the children's attitude decide. Pleasurable absorption, not necessarily pleasurable *excitement*, that is the true test. There are matters in which it is undesirable to apply the principle of freedom unreservedly, especially with children. Like the savage who will ruin himself if he is free to choose as much whisky as he desires, so the child may injure himself if he is free to choose mental or bodily stimulants. This is by some believed to have been Dr. Montessori's reason for not including stories in her curriculum.

With regard to the question of truth, it appears to the writer that no objection can be made against

[1] It may appear to the reader that while there could be no objection to letting each child choose for himself in the first instance whether he will join the story circle or not, yet that to allow him to leave the circle after the story has been commenced is to encourage him in bad manners. The objection certainly deserves consideration. As adults, we have not yet reached the stage in which, like Lord Dundreary in the play, we may stop the bore with the simple interruption, "The conversation is ended." Listen we must till some opportunity arises when we can escape without giving offence. Until, as adults, we shall have attained to such perfection of manners that candour is compatible with courtesy, we must certainly practise children in courtesy before we launch them into the world. It is all a question of the age at which to begin such social training. In the writer's opinion it is desirable to apply the Montessori principle very fully to story-telling in the earlier years of childhood; as the children grow a little older, they should be made to feel, almost insensibly, that courtesy requires them to restrain impatience.

stories of impossible happenings, if it is known that they are "make-believes." Children usually enjoy a make-believe quite as keenly as a true story. Who doubts the interest of the make-believe in the game of silence—"Here there is no longer anyone; the children have all gone away"? Santa Claus may be enjoyed just as much as a make-believe, as it is when the children are falsely taught that he does really come down the chimney. If they have been accustomed to think of Santa Claus as a real visitant from another world, then no doubt the charm is lost when they are undeceived. Nor is that all. There must be some readjustment of attitude towards what they are told, and moral injury, sometimes serious, may result.[1]

Caution is necessary in regard to the type of story. It should not be such as to give rise to fear, whether repressed or not. Children may like "creepy"

[1] The verger of Christchurch (Hampshire), after taking a party round, asked the youngest member, a little American girl, how much she would remember of all he had told them. She replied, with a defiant air, "I don't believe a word you say." Before leaving, the mother apologised and explained. The little girl, it appeared, had discovered, the previous Christmas, that there was no Santa Claus, and had since refused to believe anything she was told. This is no doubt an extreme case, but the warning should not be neglected. Less in degree, no doubt, but the same in kind, *some* moral injury is almost sure to follow the discovery that falsehood has been substituted for truth. And the injury is so unnecessary; the known make-believe is enjoyed just as much by little children. A good make-believe is indeed much more than a *mere* make-believe; it has in it some of the characteristics of a reality. This is true even of adults. We find no satisfaction in altering the termination of a novel—the alteration has not the reality of the original make-believe.

stories, but except with phlegmatic children, the liking is generally unhealthy. It is far better to avoid them altogether with young children. No one can tell what harm they may do. If "the thoughts of youth are long, long thoughts," far more are the terrors of childhood long, long terrors. Even the most loving of mothers may never know the secret fears which keep the child awake at night. With its more rational half the child knows its fears are groundless; it is not much help to be told that they are, and there is always the dread of being laughed at. Often the child, unaccountably pale, may be asked whether anything is troubling it, and the answer is "No," an answer at once true and untrue. In such a case, and with a nervous or overstrung child, the wise mother will not ask or urge, but will do what can be done to provide healthy mental occupation and quiet sympathy, and, above all, will not try to laugh the child out of its fears nor insist on its doing what for it are fearsome things—such as going into dark rooms. Such dread, cowardice, if you will, is natural to man; it is doubtless a survival from the long ages when the night was full of sudden calamity from unseen foes. There are few indeed who, like Timothy Nevershake, are wholly emancipated from the fear of the unknown; few who have never felt, with Coleridge—

> "Like one, that on a lonesome road
> Doth walk in fear and dread,
> And having once turned round, walks on
> And turns no more his head;
> Because he knows a frightful fiend
> Doth close behind him tread."

Let us do nothing to encourage such unreasoning and unwholesome dread.

The Second Grade

In the second grade the exercises in movement which have been found specially suitable, are to rise and be seated in silence, and to walk gracefully along a line traced on the floor, while the teacher plays a rhythmic march till the children know it thoroughly; then they accompany the music with little movements of their own, according to the rhythm.

In this grade the games are not all played on the tables, so that the pupil has now to pick up objects which have been scattered on the floor, and thus to kneel down and rise up while he holds things; and he also learns to carry heavy objects.

The special apparatus for exercising the child's sense of form and estimation of sizes is more extensive than in the first grade, and the control is always by the eye, never mechanical.

First in order of ease are the cubes, the sides beginning at 10 mm. (0·4 in.), and increasing by 10 mm. for each, so that the last is 100 mm. (4 in.). These are scattered about, and the child has to select them in order, beginning with the largest, and to place them one on the other. The most frequent error is to begin with the second cube,[1] and in that case the error is only

[1] If it be nearer than the largest, it will appear larger to the untrained eye of the child—in fact, if we did not unconsciously make allowance for distance, the second cube at 9 feet distance

found out when the column is finished—the largest cube is seen to be lying about. Interchanges in order are, of course, discovered by the unevenness of the

FIG. 11.—The Tower.

series. Where several children are playing on the floor at the same time, a little carpet may be given to

would look the same as the largest at 10 feet. But the smallest but one would have to be 18 feet away to subtend the same angle as the smallest at 9 feet.

each child, so that he puts all his cubes on it, thus avoiding confusion.

Although classed by Dr. Montessori in the second grade, this exercise is probably at least as well fitted for the first grade as the last set of cylinders. Its objects are to give delicacy of handling—it is not easy to build the tower—and to practise the eye in forming accurate estimates of the effect of distance on the apparent sizes of objects.

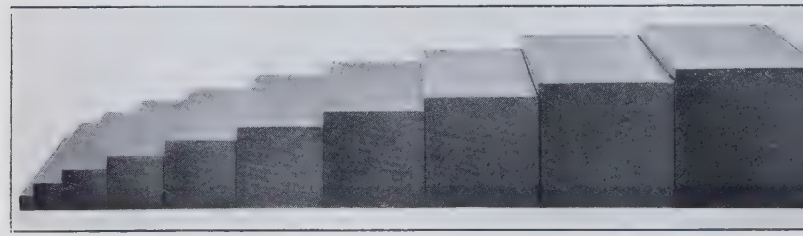

FIG. 12.—The Broad Stairs.

The next in order are the broad stairs. Here the pieces are prisms, all of the same length (double that of the largest cube), and the square ends form the same progression as the cubes, *i.e.* their sides are from 10 mm. to 100 mm. in length. They are scattered about, and the child has to form them into stairs. With the broad stairs the child may commence with any prism and build it up on both sides. (It would be a good exercise also to place them one over the other in an oblong tower, as this would require more delicate handling than the cubes.)

The next set consists of ten rods of the same size (30 mm. square) in section, but of different lengths. The shortest rod is one decimetre long and painted red, the next is two decimetres, painted red and blue, and so on, up to the last, which is 10 decimetres long, alternate decimetres being painted in alternate colours. The rods as shown in the figure are arranged as the long stairs; the dark and light columns do not represent a separation of material, but only the super-

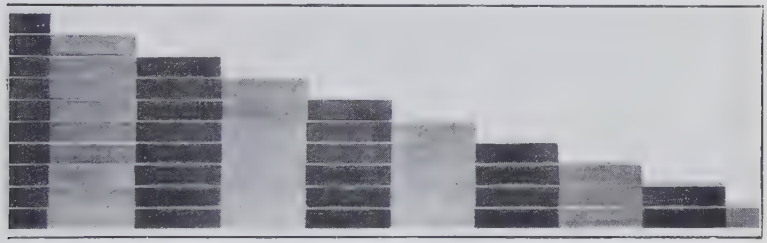

FIG. 13.—The Long Stairs.

position of red over red and blue over blue. The long stairs are arranged in a horizontal plane, not in a vertical one, like the broad stairs.

The long stairs are much more difficult than the broad stairs. The rods have to be turned in the proper direction,—to interchange the ends of the alternate rods would break the vertical colour series,—and the fact that they are coloured in this broken way interferes seriously with the estimation of length, because the eye does not take them in as a whole. Hence the child tends to count them, which is a much higher process

than mere comparison of length. (The apparatus is open to criticism—it is devised for a double purpose—to teach arithmetic as well as form, and it is by no means clear that it is the best way of teaching arithmetic. Dr. Montessori tells us that it is "only after they have for a long time eliminated every error in constructing the other two sets," that they succeed in arranging the long stairs perfectly, which appears to indicate that the gradation of the exercises might be improved.)

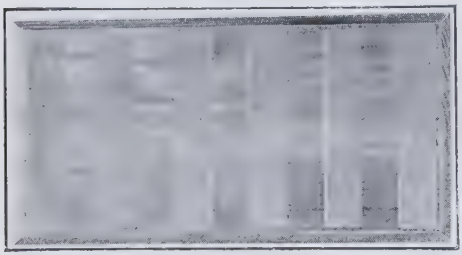

FIG. 14.—Material for Tactile Exercises.

Next in this grade come the exercises for training the sense of touch in its several forms. As touch is more acute when the hands are warm and clean, the general exercises in washing and cleanliness are given as preparatory to those in touch proper. After the hands have been

washed, they are rinsed in tepid water and dried carefully. Then the child is taught to distinguish between the temperatures of a number of bowls containing water from cold to warm, and to pick out two bowls which are at the same temperature.

Next, or if more convenient a little earlier, come the purely tactile exercises. The child is taught to touch surfaces *very lightly*, as described in the previous chapter. In order both to concentrate his attention on the feeling at the finger-tips and to test his recognition of the object touched, he is told to close his eyes while touching. Paper, graded from smooth to the roughest sandpaper, and various woven materials, are used. The children take great delight in touching soft, velvety surfaces, and in recognising what they touch with their eyes shut. They call it "seeing without eyes."

The apparatus, as supplied by Messrs. Philip & Tacey (Fig. 14) consists of—

(1) A rectangular wooden board, one half with smooth surface, and the other half covered with sandpaper.

(2) A rectangular wooden board, with alternate strips of sandpaper and plain smooth surface.

(3) A polished wooden cabinet of seven drawers, containing pieces of different fabrics in duplicate—Silk, Muslin, Calico, Linen, Cloth, Serge, Velvet—by means of which the child learns by feeling the difference in texture and quality, *e.g.* coarse, fine, soft, rough, smooth, thick, thin, etc., of the various materials, and also, later, to name them from touch.

With these come the colour exercises. Dr. Montessori uses eight principal tints, blues, browns, greens, greys, etc., with eight gradations of colour in each, making sixty-four tints in all. They are made of wool or silk wound on spools, and each spool has wooden projections at the ends so that the material is protected from being soiled. Thus the child can be asked to match any colour from one set with the similar colour from the other set. At first only a few vividly contrasted colours are used; thus a pair of red and a pair of green colours may be put before the child and he may be told to find the match of the red one, and so on. When he becomes more accustomed to the game, more colours are put out at the same time, so as to increase its difficulty. Later he may be asked to arrange the sets of eight-colour gradations in order. When two or three children are playing this together, the teacher may mix up on the table as many sets of gradations as there are children, and let them sort them out, each collecting all the colours of one of the gradations.

It would be an excellent and useful exercise in the discrimination of colour and form to practise children in finding objects on the floor.

Colour memory may also be trained. A child is shown a colour, and is allowed to look at it as long as he will, and then after an interval, short at first and then longer, he has to pick it from a group of many, or, perhaps, of all the colours. Colour-training affords a good example of the principle on p. 237. A child coloured the trunk of a tree red; Dr. Montessori did

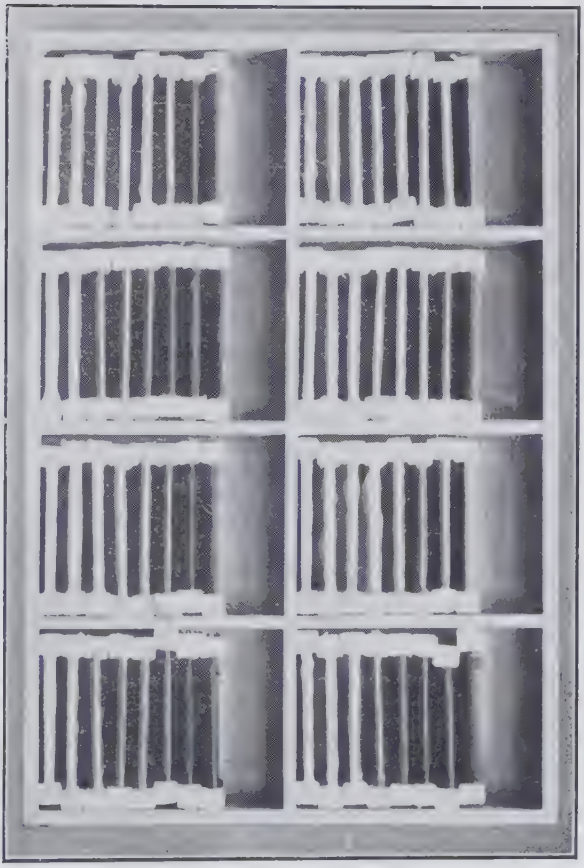

FIG. 15.—Colour Spools.

not point out his error, but "encouraged" him to use the games for the chromatic sense, and at the same time gave him outlines of trees to colour. One day he made the trunk brown but the branches green like the leaves. Later, he made the branches brown. This is a slower process than telling him, but it is surer. Probably, however, it would have been wiser, after he had made the discovery, to have encouraged him to reflect on it. Perhaps if she had done so she might have found that the boy knew all along that the trunk was brown, but thought it looked prettier when painted red. We cannot always conclude that children's motives are what they appear to the adult mind.

For convenience of description, all the problems in colour gradation have been given together, but the recognition of *gradations* in colour belongs to the next stage.

Dr. Montessori says that "the child must already have acquired a certain grade of education of the attention through preceding exercises if he is to repeat this one with interest," *i.e.* pairing colours as first described above. This may be true of very young children, but there can be no doubt that many children would enjoy the exercise although they have had none of the previous training.

Before devising these exercises on colour, Dr. Montessori had tried an instrument invented by Pizzoli for training the colour memory. A disk painted in several colours can be rotated behind an aperture

in a screen, so as to bring the colours into view successively. The teacher sets the disk, gets the child to observe the colour very carefully, then turns the disk slowly, and asks the child to say when the colour reappears. "This exercise," says Dr. Montessori, "rendered the child inactive, preventing him from controlling the material. It is not, therefore, an instrument which can promote the *education* of the senses."

While there is no doubt that freedom to control the material is in many cases a very important element in maintaining the child's interest in any process, we cannot altogether accept Dr. Montessori's explanation, nor allow that the education of the senses cannot be promoted by occupations in which the material is controlled by the teacher.[1] The child is just as effectively prevented from controlling the material when the teacher places two red and two blue spools on the table and, pointing to one of the blue spools, asks the child to pick out the other. In all probability the real reason of the failure of the rotating-disk method was that it presented a very difficult problem to the child. To sort out two pairs of coloured spools when he can look from one to the other as often as he likes,

[1] It may seem trivial to criticise such an incidental statement at length, but the point involved is not a trivial one. On the contrary, it is of the utmost importance that teachers who are to carry out Dr. Montessori's own principles shall be trained to examine very carefully into the reason of each failure of interest on the part of the pupil. Especially is this the case where the attempt is made to apply those principles under the different conditions of another race and country.

and, no doubt, can see them simultaneously, requires little if any exercise of the child's memory. In contrast to this, the disk method puts a greater strain on the memory and attention than even the *last* of the colour exercises in Dr. Montessori's sequence. For in the disk method not only has the child but *one chance of looking at the original colour so as to impress it on his mind,* but also he has but *one chance of looking at each of the revolving colours to see if it is the right one.* Moreover, the fact that he has to concentrate his attention on one colour after another as he rejects it, confuses the memory of the first colour. Thus we see that the mental operations involved are totally different from those in the Montessori method of sorting colours, in which the teacher may begin with as few tints as she likes, while in the disk method he must go through the whole series. Again, the Montessori child may merely glance at the wrong colour, and if that confuses him, he can at once refresh his memory by another look at the right one, and then let his eye rove over the spools until it is caught by the right one.

The discussion, lengthy though it be, will not have been in vain if it helps to prevent the currency of phrases such as "the child must control the material," which might easily become mere catchwords in the hands of teachers less gifted than Dr. Montessori. It is quite likely that the disk method would greatly interest a class of children who had been prepared for it by the other exercises in colour and colour memory, and in that case it would probably be a very

effective means of promoting the education of the colour sense.

Third Grade

Here the children further perfect themselves in washing, dressing and undressing themselves, and they learn to dust the tables, and to handle with care various objects. They also complete the sense-training lessons of the second grade, arranging surfaces in the

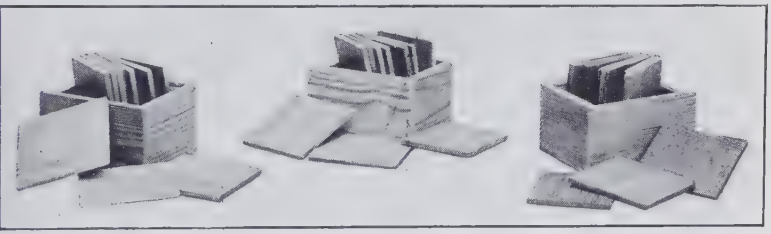

FIG. 16.—Tablets of Different Weights.

order of the roughness, and sorting colours into the graded tints.

The children are practised in judging of weights. Wooden tablets are used, all exactly the same size, but of three different kinds of wood, so that they weigh about 12, 18, and 24 grammes. At first the child feels the weights with the eyes open; but after a little practice the eyes are shut, and he tries to judge which of the three weights is placed on his palm. The surfaces of the tablets are smooth and varnished, so that they give no help to the child. (It might be

well to extend the series of weights; in British measures they are about $\frac{1}{2}$ oz., $\frac{3}{4}$ oz., and 1 oz., which is a very small range.)

In this grade are also commenced the exercises for the discrimination of sounds—a series of little whistles of different pitch are used for musical sounds, and there are small boxes filled with different materials which give different noises when shaken.

FIG. 17.—Sound Boxes.

One easily gathers from Dr. Montessori's book that she is not satisfied with these methods of ear training. In the first place, they afford but little scope for the child to exercise his own activities for himself; it is, indeed, difficult or impossible to devise any plan by which that object can be obtained, since it is impossible to provide separate rooms for each child. In the second place, the children take no delight in the sounds of the whistles and boxes. She believes the best results would be obtained from the means used by Itard in 1805, namely, a series of drums and bells of graduated pitch.

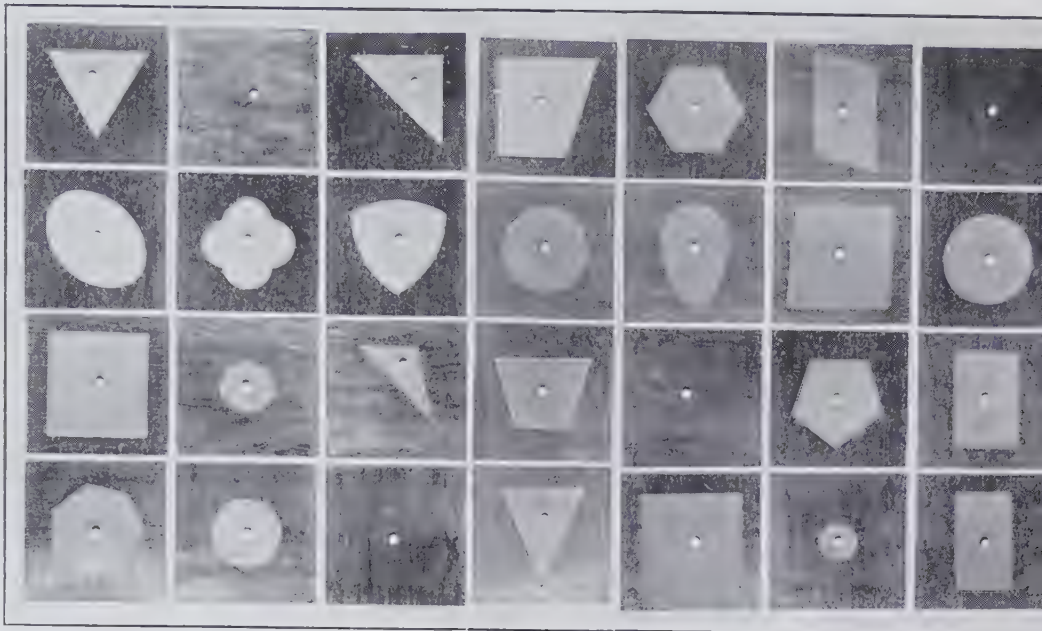

FIG. 18.—Wooden Insets and Apertures.

In this grade the geometrical insets are first used. They consist of a number of wooden or metal figures, fitted with handles, so that they can be inserted into the corresponding apertures. The idea of these insets dates from Itard, and they are regularly employed in some modern schools for manual training. Fig. 18 shows the forms of the insets used.

There is also a series of cards on which the same geometrical forms in the same size as the wooden insets are printed in solid blue. Dr. Montessori added to them two new series of cards, in the first of which the same geometrical forms are depicted by a thick blue contour, and, in the second, the same geometrical forms appear in thin outline.

The exercises with these insets are assuredly excellent for giving certainty to the child's geometric ideas. At first he is given a few—half a dozen—of the frames containing the apertures, with the corresponding insets mixed together on the table, and the game consists in putting them back in place—somewhat as when older children build up a dissected map. The little children find this difficult. Even to put a rectangular inset into its aperture is not easy—many children are likely to begin by placing it across the aperture instead of along it, and they will even try to fit a triangle into a rectangle, and so on. Because they cannot yet form a mental picture of what will happen, it is almost a case of perceptual skill, like that of Prof. Lloyd Morgan's dog, referred to in Chapter IV. (p. 48).

The child's recognition of the shapes is greatly

assisted if he is taught to *feel* round the outlines of the insets, as described in p. 129, so that he learns the

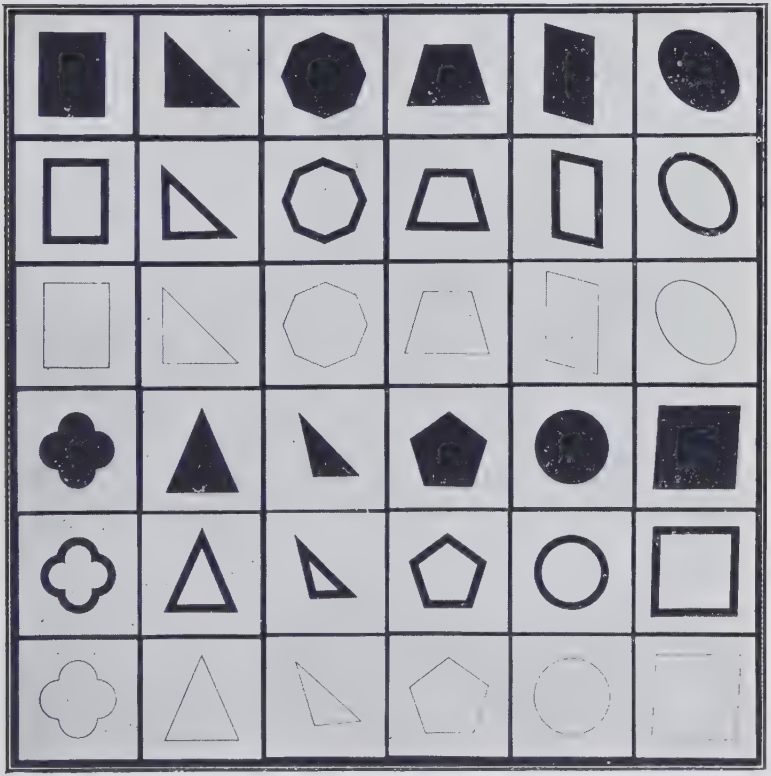

FIG. 19.—The Three Series of Cards.

shapes by the motor memory. *This should be made a habit with the child,* and there are advantages in its

being done blindfold, as shown in Fig. 20. (Observe that owing to the small size of the table and chair the child looks bigger than she really is.)

FIG. 20.—Child feeling Inset.

When practice has given certainty with the insets, the game is changed; the wooden pieces are now to be exactly placed above the cards; here the control is

exercised by the eye and not mechanically, as with the insets and apertures.

Lastly, the same exercises are continued with the contour and outline figures, the idea being that the child passes gradually from the idea of the solid wooden figure to their plane representations on the first series of cards, and finally, to their outline representations on the last set, the contours giving an intermediate stage. (How far the contour stage is desirable will probably depend on the age of the child. It would seem perhaps more in accord with Dr. Montessori's own principles to let the child draw the outline, as described below for the metal insets, and thus discover for himself its relation to the plane figure instead of presenting it to him on the last series of cards.)

Those who are not accustomed to watch the slow way in which children's ideas of space develop, will find it difficult to realise the importance of these exercises. Mentally they serve as a preparation for geometry. A preparation only. They do not serve to introduce the intellectual elements in geometry, that in which, *e.g.*, we analyse the concept of a triangle. They give perceptual knowledge, which is needed to give reality to intellectual knowledge—and the lack of this feeling of *reality* is disastrous to sound intellectual knowledge, as many university examiners know. Physically the careful training in handling objects involved, *e.g.* in placing the insets exactly over the outlines on the cards, is very valuable; and if Dr. Montessori's directions are followed, that the children are to touch round the outline of

the inset when it is placed on the card, and to do this without shifting it, the result must be to add greatly to the delicacy of touch which is so striking a feature in the children of four years of age, of whom we read that they handle crockery with so sure and steady a touch that they have no tendency to break it.

Fourth Grade

Here the children arrange the meal table—lay it, wait on their comrades, and clear it. "They learn to put a room in order. They are taught the most minute care of their persons," *i.e.* of the nails, the teeth, etc. They are perfected, through walking on the line to the rhythm of music, in free and graceful motion and balance; and in the moving of objects, even heavy ones, without noise. These exercises of practical life are continued from the previous grades and extended. For example, they wash up the crockery used at lunch. All this should be very carefully *taught*. Thus, in carrying tumblers placed on a tray, the child should be shown how to balance the tray so that it shall have no tendency to overturn one way or other. Those who are not *taught* how to handle objects properly often get into bad and jerky ways, and they may never be able to conquer their bad habits. This is why so much crockery is broken.

The way in which the little children wait at table is a surprise to every visitor. Children of four years old carry trays with five water glasses standing on

them, and not a glass is broken; they carry soup tureens from table to table, not a drop is spilled. "A little thing of four and a half, every time he set the tureen down on a table so that the little guests

FIG. 21.—Washing Up after Lunch.

might help themselves, gave a hop and a skip, then took up the tureen again to carry it to another table, repressing himself to a sober walk. In spite of his desire to play he never left his task before he had passed soup to the twenty tables, and he

never forgot the vigilance necessary to control his actions."

The exercises directly connected with writing are now commenced. In the Montessori apparatus, metal

FIG. 22.—Touching the Letters.

insets and frames, similar in size and shape to the wooden geometrical figures, are provided. The child, already skilled in following round the edges with his finger, now runs round them with a pencil, so as to draw the outline on a piece of card, which he subse-

quently fills up with coloured chalk, and he then

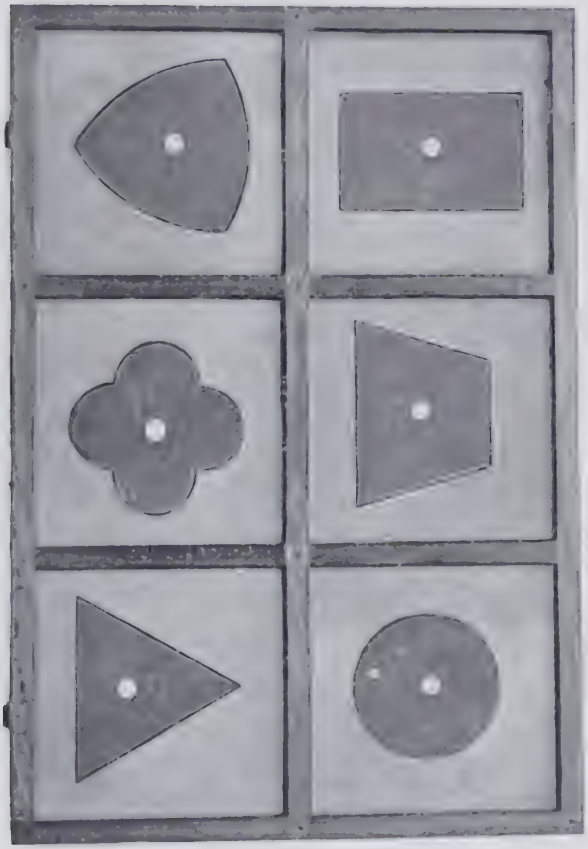

Fig. 23.—Metal Insets and Apertures.

learns to touch the letters, as already described in Chapter V.

This special use of the metal insets, which Dr. Montessori gives as preparatory to writing, would seem to be rather an introduction to geometry than to handwriting. The child places one of the metal frames on a piece of paper, and then, with a piece of coloured chalk, he draws the outline of the aperture. Having thus traced the aperture, he places the inset upon it and draws with another coloured chalk the outline of the inset. "He often marvels," Dr. Montessori writes, "to find the same figure reproduced by means of pieces so different, and looks for a long time with evident pleasure at the duplicate design." Even the adult can understand how difficult is the conception that a concave curve is one and the same thing as a convex curve—to the child it may well come as a new revelation.

(Judging from the metal insets as provided in the Montessori apparatus, it would certainly appear that in teaching handwriting, it is best to adopt the method described on p. 132, rather than to ask every child to fill up the exact shapes and sizes of the outlines given by these insets. It would also seem as if one set of insets might serve all the purposes of the two sets actually used. Some teachers will also object to colouring vowels differently from consonants (p. 132), as being an unnecessary and artificial device. Against the objection it may be urged that some general distinction of form has been naturally made by mankind, *e.g.* in alphabets where the vowels consist of dots only, and that, as the general distinction has no place in our alphabet, it is desirable to introduce one in the

earliest teaching of children. There is no doubt that the distinction is an important one and should be carefully emphasised; whether it is necessary or desirable to use a temporary device of this kind is a matter which each teacher should be in a position to decide for himself.)

It is in this grade that arithmetic is commenced. It will, however, be more convenient to devote a separate section to it.

All the sense exercises are said to be repeated in this grade. This must be a matter for the judgment of the teacher. It might be no advantage to repeat, *e.g.*, the putting of the first set of cylinders in their holes again. But there is one valuable sense exercise, described earlier in Dr. Montessori's book, which is not mentioned among the work of the grades, viz. the recognition of shapes of solid objects by touch. The child, blindfolded, is first given simple objects, such as the bricks or cubes of Froebel, which, being held in the hand, are recognised and named. Later, almost any small object is taken up, with eyes shut, and felt over, the children distinguishing between objects so small and so nearly similar as corn, wheat, and rice; coins are favourites too. The interest is enhanced when other children look on, and here, too, they cry, "I can see with my hands," "Here are my eyes." This is an exercise suited for the earlier grades.

Dr. Montessori gives in this grade exercises in Design, passing from the geometric figures of the insets to certain outline figures which, she tells us, the practice of four years has established, and which are to be published as standard drawings. "These have an educational importance, and represent in their content and gradation one of the most carefully studied details of the method." Yet, however valuable these outlines may be, the teacher who would follow them implicitly would be false to the principles which should guide her. Especially in a creative subject like art, where individuals differ so much, and where environment has so great an influence in modifying taste, it is important that everything shall be as spontaneous as possible. (There is not at all the same objection to using manufactured apparatus as "didactic material"; it is intended to cultivate aptitudes which are fundamental in our physical natures, and therefore of the same character in all children.)

Similar remarks apply to water colours and drawing from nature in the next grade, as well as to modelling. All these are extremely valuable. They are educative to the pupil and to the teacher—to the latter because they reveal the pupil. But they are in no sense peculiar to the Montessori school. We can probably show better results in some of our home schools than anything which has been done in Rome. Indeed, we are forced to the conclusion that Dr. Montessori herself under-estimates the importance of some of these activities as educative agencies. Speaking of plastic

work, in which the little children learn to make vases, and to make and to bake little bricks, with which they build, first walls, then houses ornamented with tiles of bright many-coloured majolica, also made by themselves; then eggs and fruit and flowers;—speaking of this, she says (p. 163): "Plastic work, as I shall show later, serves for the study of the psychic individuality of the child in his spontaneous manifestations, but not for his education." No attempt is made to justify the last assertion of this sentence. Indeed, it would not be possible to do so unless we regard education as meaning little more than the three R's—a limitation which Dr. Montessori herself would emphatically reject.

Fifth Grade

The exercises of the preceding grades are continued with more complicated rhythmic exercises, and, in design, water colours, and free drawing from nature. Writing and reading exercises continue, with arithmetic. Though the description of the curriculum may be very short, the period itself is full of occupation and interest.

4. *The Teaching of Arithmetic*

Numeration is first taught by putting the children to count common objects, coins being among the most interesting and useful—the continental coinage, being based on the decimal system, is, of course, more appropriate than ours. Occasion is taken to apply counting

as far as possible to daily life —" How many buttons are wanting ? " and so on.

Having thus taught numeration, Dr. Montessori employs the rods of the long stairs. We have already seen that the mere fact of their being broken in length by difference of colour tends to make the child count when he estimates their length. It appears from her experience and that of some other teachers, that the children do like playing with these rods, putting two together, so as to make up 10, and so on, and then seeing in how many ways they can do it. Thus they learn that $1+9=10$, $2+8=10$, $3+7=10$, $4+6=10$, and, by taking the 5 rod twice over, $5\times2=10$. And as there is no need to stop at 10, longer lengths may be made up—thus $10+1=11$, $9+2=11$, and so on. Thus, also, the meaning of the signs $+$, $=$, and $\times$ are taught.

Subtraction is taught similarly, and division, for $10\div5=2$. Thus even and odd numbers are taught, and always illustrated by concrete examples from the rods.

Again, it is found that the children like to count each side of the triangle forming the long stairs and are interested to note that counting the ends of the sticks either along the vertical or along the sloping side gives the same result, 10, as counting the colours along the base.

Teachers who have been able to arouse the children's interest in arithmetical operations by means of bundles of sticks, coins, bags of beans, or the like, will rightly hesitate before employing the more artificial means of

sticks painted in alternate colours. Still less, when they have taught place values by getting children to count numbers of objects into groups of tens and units left over—the number of groups and units being then written in two columns headed "tens" and "units" respectively—will they use Dr. Montessori's method of teaching place values;—"Counting along [the sloping side of the long] stairs as far as nine, there remains this one section which, as there are no more [written] numbers [than nine], we again designate as 1; but this is a higher 1 than the first, and to distinguish it from the first, we put near it a zero, a sign which means nothing. Here then is 10." There is further explanation, but to the writer it does not appear to place the matter on a proper basis. If place value be not taught dogmatically in the earliest stage, a valid explanation, not a fanciful one, should be given.[1]

[1] As an account of a method by one who is out of sympathy with it is usually unsatisfactory and often unfair, a translation from the Italian edition, very kindly sent by Miss H. E. Barton, is subjoined:

"Lessons on the Decimal Numbers

"*Arithmetical Calculations beyond* 10

"The necessary didactic material consists of a number of square cards on which 10 is printed in figures five or six centimetres high and of other rectangular cards half the size of the square on which are the figures from 1 to 9. We place in a column the simple numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9. Then, since there are no more numbers, we must begin again—and take the 1 again. This 1 is like that section in rod 10 which in the system of lengths projects beyond the 9: counting along *the stair* as far as 9, since there are not more than 9 figures, there is left this last bit—which we again begin to mark with a 1—but this is a 1 placed higher up and to distinguish it from the other we will put beside it a sign which =

But in contrast to this unappreciative criticism of the mathematical aspect of the technique, there can be

nothing: the zero. This is 10. Covering the zero with the separate rectangular number cards in the order of their succession we form: 11, 12, 13, 14, 15, 16, 17, 18, 19. Such numbers are composed with the rods by successively adding to the 10 rod the 1; then substituting the 2; and then the 3, etc., until adding the 9 to the 10 we get a very long rod: counting the successive blue and red sections we get 19.

"The directress may then direct the movements of the system of length by showing the cards of 10 and of the figure placed upon the zero—for example, 16: the child adds the 6 rod to the 10 rod. The directress removes the 6 card from the 10 card and puts on top of the zero the rectangle with, for example, 8: 18; and the child takes away the 6 rod and in its place puts the 8 rod.

"Each of such exercises can then be written down, for example: $10+6=16$; $10+8=18$, etc. For subtraction the process is analogous.

"When the number in itself begins to have a clear meaning for the child the combinations are made on the cards alone -variously arranging the rectangles bearing the nine figures on two columns of numbers which are printed on long cards, as in figures A and B.

A	B
10	10
10	20
10	30
10	40
10	50
10	60
10	70
10	80
10	90

"On card A we place upon the zero of the second 10 the rectangle with 1; below it that with 2, and so on; and while in the left-hand column the 1 of the 10 remains, in the right-hand one all the figures from zero to 9 follow one another, thus: —→

10
11
12
13
14
15
16
17
18
19

"In card B the applications are more complex: the number cards are successively replacing one another in order of numerical progression placed upon the zero of each multiple of 10. After the 9 it is necessary to go on to the next multiple of 10, and so on to the end, which is given by 100. Nearly all our children count to 100 a number which was *given* to them, in response to the curiosity they showed for learning it.

"I do not think that such teaching needs further illustrations.

nothing but praise for the games by which numeration is taught, especially that for teaching the meaning of zero. For example, two trays are divided each into five little compartments, each compartment being marked with a numeral, *i.e.* 0, 1, 2, 3, 4, in the first, and 5, 6, 7, 8, 9, in the second. The game is to put in each compartment the corresponding number of objects—seeds, coins, etc. When done, the child brings the tray to the teacher, and almost invariably asks what is to be put in the zero compartment. The reply is, "Nothing; zero is nothing." But that seldom makes it plain, and Dr. Montessori calls to a child to come to her zero times. When he comes, "But I said to come zero times, and you came *one* time." Gradually it dawns on them, and they enjoy the fun of being told to come zero times and yet not to go at all; or to blow her zero kisses, and yet to blow none.

There is a game for the memory of numbers. The children each draw from a box a folded slip of paper with a number marked on it. They look at them, read them silently, fold them again, and leave them at their seats. Then they walk to a table where many objects have been arranged, and carry to their place the number of objects on their cards. These objects are then arranged in double columns, with one over if it is odd. When all have completed their task, the teacher walks round, unfolds the slips, and verifies the numbers.

Each teacher will be able in practice to multiply practical exercises on arithmetical operations, using objects that the children can put together or divide among companions."

The game gave very interesting results. At first the children often took more than the right number of objects, and this deliberately, not liking to have only a few. They showed "a little of that greediness which is common to primitive and uncultured man. . . . It is a real effort of self-control which holds the child within the set limit, and makes him take, for instance, only two of the objects placed at his disposal, when he sees others taking more." The poor child who draws a zero has to remain inactive at his place while his companions are enjoying their active participation in the game. In the manner of bearing the disappointment the child's character is seen—some watch their companions with impatient envy—others try to look pleased, but rarely succeed. It is a test of character, of self-control, as well as a lesson in arithmetic.

In reviewing the Montessori practice, it will be observed that one of the most striking features is the care with which the pupils are *taught* how best to do the various acts of daily life which are usually picked up anyhow. It is difficult to over-estimate the importance of this careful teaching.

CHAPTER VIII

CHARACTER AND DISCIPLINE

BESIDE the "knowledge-end" in education there is the "character-end," rightly esteemed the most important. It is manifested in two allied qualities—allied though not necessarily united in the same individual. There is mental character; in regard to it the end to be aimed at is that our teaching shall foster the power of making a well-directed mental effort. There is also moral character; in regard to it we must foster the power of making a moral effort. In a mental effort we bring all our energy to bear on the problem before us; we allow no distracting thoughts to disturb us, however enticing they may be; we compel ourselves to work. In a moral effort, if we cannot banish the enticing thought, the strong temptation, we summon all the power of our will to compel ourselves to do our duty, whatever be the consequences to ourselves.

It is very easy to select from Dr. Montessori's book not only isolated sentences, but whole paragraphs which appear to show that she places but little value on direct training in effort, in fact that she disapproves of it. Thus (p. 226) she gives, as the reason for not

revealing the error when the child makes a mistake, that we might lead him " to make an undue effort to remember . . . and it is our duty to avoid as much as possible all unnatural effort." Again (pp. 237–8), after speaking of the voluntary effort the child makes to understand and imitate the language of those round him, she says it is our duty to lessen this expenditure of poorly directed effort, and she likens the child to a traveller through life. " It is our privilege to lead him to observe the most important and the most beautiful things of life in such a way that he does not lose energy and time in useless things, but shall find pleasure and satisfaction throughout his pilgrimage."

It is no wonder that those who, in a lax age, value strength of character whether in the mental or the moral world, ask themselves whether this is the way to produce it. Even if we could guide these travellers all the days of their pilgrimage, shielding them from all that was painful or disagreeable, who but a weakling would choose to be so nursed? But we cannot; soon they must fend for themselves and in a world which is often harsh enough. To put it on the lowest material plane, how will such an education help them then? Or again, to put it on a higher plane, how will such an education enable them to attain the greatest conquest of all, that of self? What room is there in it for high ideals? Does it not make pleasure and satisfaction the ultimate good? Will it not produce men and women unable to make themselves do what they know they ought to

do, if it should involve discomfort—unable, as Locke puts it, " to deny their desires, to cross their inclinations and to follow purely what reason directs, though appetite lean the other way." Can we hope that it will give us what we need most, men and women who can and will choose the harder path ; who, not always desirous of new sensations, will restore something of the simplicity and strength of life, as it was before the nation spent such vast sums on its amusements ? That it will increase the power to overcome difficulties by patient and pertinacious effort ?

The final answer to these questions can only be given after long experience of the results of the Montessori method, when carried out as a whole. But since we cannot wait, and especially since there are many critics who seem to have no doubt whatever that they can answer these questions off-hand, it is well that the matter should be examined as carefully as possible, and in the light of all the material available.

First let us ask, What is effort ? It implies a conflict of tendencies in the organism. In the very young infant there is no appearance of any such conflict ; the nervous energy always finds an uninterrupted motor outlet—it never seems to be shunted from one path to another. The resulting movement may indicate that the prime cause is an external stimulus, as when the baby turns to the light, or that it arises from some internal accumulation of energy, as when the baby clenches its hands in sleep, but in each case the discharge appears to exhaust itself along the original path. There is no indication

that another stimulus arises to compete with the first, or that there is any tendency for the discharge to pass off along a second path. But after a time the baby enters on a new stage—a movement, though commenced, is interrupted. We infer that there is a competing stimulus or a competing path. Since there is no appearance of conscious deliberation, we often say that the little child yields to the strongest stimulus. The idea underlying this somewhat inaccurate expression is that the child is not yet a personality, that *it* (observe the impersonal pronoun) does not control its actions but passively responds to the stimulus, and we are inclined to take this view even where the stimulus is due to some internal accumulation of energy. This is justifiable on the ground that there is no evidence of a control being exercised by the organism generally. Nevertheless, these interruptions afford the first evidence of the growth of those connections between the different parts of the nervous system through which, at last, the response of one portion of the organism to a stimulus is controlled by the rest of the organism. These connections form the physiological basis of self-control. So long as the response to a stimulus depends only on the part directly stimulated, there can be no self-control.

As these connections gradually become more fully organised, the nature of the interruptions gradually changes. They depend less on direct stimuli. The baby no longer appears to make a merely passive response ; the mode in which the movement is changed seems to indicate something like choice ; even when

the stimulus is a simple one, applied to only one element in the organism, the response appears to depend on other elements as well. This power of varying the response is what develops later into voluntary self-control, or will. It begins to take its final form as the manifestation of the child's personality only when the child acquires the power of forming mental pictures of future situations, pictures which must include the representation of the feelings which those situations will arouse. Before this stage is reached the child's actions belong to the non-moral world. With the power to resist the tendency to one course of action because he judges another to be more desirable, the child enters the moral world. True, his life as a moral being is at first but the smallest fraction of his whole life, and even in those actions which bring him into the region of morality, the moral significance is of the slightest—we should hardly, at this early stage, speak of them as right or wrong. Nevertheless, the germ out of which the distinction will grow has been manifested. Character is now no longer to be regarded as a mere physiological attribute of the organism. We can now speak of it in its aspect as determined by the child's personality as well as by what we are accustomed to look on as his physiological responses to stimuli.

Even when this stage has been reached, it does not always happen that the personality is consciously involved in the response to a given stimulus. On the contrary, there remain throughout life many actions in regard to which the personality is not a recognisable

factor—actions in regard to which the organism seems to react to the stimulus according to fixed laws, fixed, that is, in the sense of being independent of the more varying element of the personality. Hence it is convenient to distinguish between what we may call physiological character, that which determines the character of the response so far as it is independent of the conscious personality, and what we may call psychological character, by which we mean the way in which the conscious personality determines the response.[1] Still later, the psychological character itself becomes complex; we easily recognise this fact through our consciousness of the conflict of motives—and we see that higher and lower motives, as we call them, are intimately related to the higher and lower spontaneities of Chapter IV.

The distinction between these different aspects of character has played a great part in the history of thought, especially in the sphere of morality. When St. Paul writes that he delights in the law of God after the inward man, but sees another law in his members, warring against the law of his mind, he is setting forth the conflict between what he recognised as the

[1] This distinction, like all our distinctions between physiological and psychological phenomena, must be looked on merely as one of convenience in language, not one of objective truth in fact, it depends rather on our ignorance than on our knowledge. That which we cannot explain in terms of personality, we speak of as physiological; that which we do not think of in physiological terms, but in terms of personality, we call psychological. With wider knowledge we should probably find this a misleading mode of description.

higher personality and either the lower personality or the flesh, *i.e.* the physiological character.[1] Regarded as a conflict between the spirit and the flesh, this opposition between the higher aspect of the personality and the physiological character has been a predominant factor in determining both the practice and the ideals of Christendom for the whole period of its existence. And the conflict between the higher and the lower aspects of the personality, the latter typified as the world and the devil, has been of little less importance. Nor has the practical influence of the distinction been confined to Christianity—it is fundamental in all systems of morality. Thus the Stoics carried the disregard not only of the physiological character, but of the lower elements in the personality, to an extreme—the great lack of their moral code was the want of sympathy for others, and with it, of the desire to alleviate human misery—a lack which was a necessary consequence of their disregard of pain and suffering.

Let us examine, in regard to the antagonisms in the organism itself, the case of a schoolboy who cannot keep his attention on his work. It wanders now to this passing distraction, now to that one.

[1] St. Paul, however, does not seem to have regarded it as a conflict between two elements in his own personality, but between himself, and an external personality dwelling in him. To him, as to much of earlier and later philosophy, personality is one and indivisible. Hence it is that, having said "What I would, that do I not, but what I hate, that do I," he proceeds to argue that if he does that which he would not do, it cannot be he who does it, but sin which dwells in him.

He makes an effort to attend; it succeeds for a minute, then his thoughts unconsciously wander off again; he suddenly awakes to find he is attending to something else, and with another effort of the will he recalls his attention to his work. What is the past history of such a case? It is a history of constant responses to these trivial stimuli. Such stimuli are always acting on the sense organs; the natural response involves a flow of nervous energy along the stimulated sensory nerves, resulting in a call upon the attention and the final discharge of the energy along the appropriate motor nerves, the effect being, for the most part, merely trivial and unmeaning actions. Unless the organism gets into the habit of disregarding these stimuli, the responses will occur repeatedly; and with every repetition, it will become easier for the nervous energy to pass along these trivial paths, and more difficult for the rest of the organism to interrupt these discharges.

It is therefore evident that if we desire to make it easy for the boy to overcome the tendency to yield to momentary distractions, it is necessary that some means should be found to prevent the child's attention being directed now to this, now to that distraction. And in the child, before the personality has become an effective force in directing the response to stimuli, there is but one way to secure this—namely, to get him absorbed in something he likes for its own sake; otherwise he will constantly respond to this and that among the stimuli which are constantly acting on his sense organs; in other words, he will be dis-

tracted by them. It follows that the best preparation for enabling the boy to resist such distractions without great effort, is to let the child occupy himself so much with what naturally attracts him that he resists distractions through mere choice—the only way in which he can resist them.

It is to be observed that the principle just laid down is not to be interpreted as meaning merely that the child is "to have his own way." He is indeed to have his way in mental occupations, but *only in a carefully selected environment.* It is here that the ingenuity of the teacher is needed. Because the child only develops the power of long continued attention by practice in continuing to attend, and because he can only continue to attend to that which continues to engross him, therefore the teacher must seek to provide an environment which fulfils that condition. If it does not do that—if it engrosses the child only by reason of its constant change and variety, then it fails in its function as mental discipline; a conception too hastily rejected by many modern educationists.[1]

[1] As the preceding and following paragraphs raise the whole question of formal education or discipline, it may be well to indicate very briefly the fallacies in the two main lines of argument by which many modern educationists have convinced themselves that the conception is an invalid one.

The fallacy in the Herbartian argument, as put forward by Prof. Adams in his *Herbartian Psychology*, is that it begs the question by ignoring the possibility that we can, by practice, improve the power of making new apperception masses suitable to the situation in which we find ourselves. One quotation must here suffice to justify this objection. He tells us (p. 75) that "The best-educated

Let us examine the educational value of the story from this point of view, that is, as mental discipline,

human being is he who has the biggest and best arranged apperception masses dealing with the life he is likely to lead." The advocate of formal discipline would add, " and has the greatest power of arranging properly the new ideas he will receive when he comes to live that life, whatever it be ; and the greatest power of creating new combinations of ideas to deal with a new problem or situation the moment it presents itself to him," and he would claim for mental discipline or gymnastic that it increased these powers, and in that way altered the quality of the mind.

A different fallacy underlies the contention, so strongly pressed by the American physiological psychologists, that the possibility of formal education presupposes that " generalised " habits can be acquired, and that a generalised habit is a physiological impossibility, because a habit is a specific response to a specific stimulus. There are two ways of escape from the apparent logical dilemma. We may either admit this definition of " habit " and challenge the opponent to show that what is claimed as the result of mental gymnastic *is* a " habit," or we may claim that the stimulus to hard work and close attention to reasoning is in a sense a specific stimulus, viz., that it is independent of the particular subject studied - a moral stimulus, depending on our feeling that we " ought " to work as hard, and attend as closely to the work, as we can. It is indeed just like the habit of resisting temptation he who refuses to yield to one temptation is better able to resist another temptation. As an instance of a mental habit which functions independently of the particular subject to be studied, we may take the power of resisting at will the distracting stimuli received through the organs of sense. If we admit as who will not ?—that this is a power which grows with practice, then it is clear that the argument against which this paragraph is directed cannot be valid.

The truth, as it appears to the writer, is that the advocates of the disciplinary education made two very serious mistakes. In the first place, they paid too little regard to the value of actual knowledge, as apart from discipline ; and, in the second place, they did not recognise that one of the worst forms of mental training is to let a boy sit down before a subject with which his mind cannot

not as instruction merely. It may be argued that as its interest depends on its variety, it must be without value as mental discipline. The answer is plain. In a story, the interest of the moment does not depend merely on the words heard at the moment. Unlike the response to an external distracting stimulus, it requires that the attention be held by much more than the immediate object from which the stimulus arises—by, namely, the *relations* between the preceding incidents and that recounted at the moment. Several ideas must be held in the mind at the same time,—if we were to forget the previous incidents, the interest would flag at once. A good story is educative as mental discipline because it gives practice in holding a number of ideas in the mind simultaneously, while we think out the relations between them.[1]

or does not grapple, so that he either learns it by heart, or does not learn it at all. Thus are explained the very poor average results of the disciplinary education, results so poor that they led theorists to invent arguments of the *a priori* type to prove that even the very conception of mental discipline must be rejected. These arguments are themselves an object-lesson in the importance of mental discipline, for it seems to need rather rigorous mental discipline to avoid such fallacies as are involved in them, though the writer says it, who should not.

[1] A series of very short disconnected anecdotes would not have this educational effect on little children. With older children, the objection would not be so strong, for good anecdotes may throw new light on past experiences, and so help to connect our thoughts. Even with little children they might serve the purpose of preventing the responses to the distracting stimuli received through the sense organs. But though useful in this respect, constant engrossment in such mental variety would be injurious as mental discipline for enabling the mind to deal with difficult problems. It would intensify the defects of the story.

Yet the story is useful rather as instruction, and for the literary or emotional and artistic ideas it gives, than for its mental discipline. As discipline it is too easy. For the most valuable kind of mental work is the hardest—that in which we search through our ideas in order to find connections which are not at first sight evident. This is a very different mental action from that which gives interest to the story, for there we have not to search for the ideas,—they are given to us in the story, and the connections between them are very evident indeed. Listening to a story is not a training for hard mental work. But we may judge that the mental work being done by the child in Fig. 2, p. 181 (and Figs. 7, 8, and 9, pp. 231, 232, 233), is of this character—he is evidently seeking for a difficult connection among his spatial ideas—a connection which he cannot see at once—one which requires him to ponder on his ideas, as he passes in review those which, with effort, he brings into his mind. The real value of mental discipline consists in practice in this kind of effort—in the effort which is needed to discover connections between ideas not previously known to be related to each other. It is in this that the highest mental work consists—what we call explanation is really finding and verifying such relations.[1] In the story, it requires hardly an effort to see the connections—in the more difficult regions of physics and philosophy only a few minds, and these the very

[1] More than thirty years ago, Sir J. Larmor made this fruitful observation to the writer, when discussing how far Newton could be said to have "explained" the law of gravitation.

greatest, can *discover* the connections, though many can *see* them when they are pointed out. From the physiological point of view, it seems plain that the difference must be of this nature :—to see the connections between the ideas in the story, the nervous energy has only to pass along very short and easy paths, connecting nerve cells or groups of cells between which, as we must consider, there is scarcely any obstacle—indeed the connection is often so easy that by no effort of our own could we prevent its being made. But in the more abstruse relations, the connections between the parts of the brain corresponding to the two ideas are opposed by some obstacle which makes it extremely difficult to project the nervous energy from one to the other. It needs a great and long-continued effort of thought—many unsuccessful attempts are made—false connections are imagined and rejected ; the mind seems to feel out in all directions. " Genius is a great capacity for taking pains "—for examining very patiently and yet quickly all the aspects of a problem. Physiologically, it would seem that the nervous energy is projected now in this, now in that direction. Many fruitless attempts are made, but each failure serves to narrow the possible directions of fruitful advance, until at last the true connection is made, and the new principle discovered ; sometimes it appears as a sudden revelation ; oftener, as a growing conviction, uncertain until the nervous energy has travelled the same path many times, pausing now at this step, now at that one, seeking here and there and every-

where for intermediate stages, lest by any chance a false step has been made.

It is in these characteristics—expressed, no doubt, in terms which only our ignorance of the physiological correlate of mental action can excuse—that, as the writer believes, the value of mental discipline consists. The disciplined mind can project the nervous energy along more resistant and longer paths in the brain, and can make it stop at this and that intermediate stage in the path, to search for mistakes. In contrast with this, undisciplined minds can only see connections along paths of but little resistance, and when once the nervous energy has passed along a path, they cannot make it pause on the way, to examine the validity of each step. In ordinary language, they can only solve simple problems, and that rather by guessing than by ordered processes of thought; they jump to conclusions, often erroneous; and they cannot find out their own mistakes for themselves.

If it be true that the power of forming valid connections between apparently remote ideas, and of verifying their validity by close examination, increases with practice, then it is essential that education should contain a percentage of difficult subjects, subjects which require the student to think both hard and long, though they must not be subjects he dislikes, for in them persistent effort is so fatiguing that it will not be persisted in. In direct opposition to the opinions of some of its critics, one of the chief justifications of the Montessori education is to be

found in that it provides mental discipline of the best type. No doubt instruction in spatial form may be the immediate object of the occupations with the cylinders, but the mental discipline of persistent effort (as shown in Figs. 2, 7, 8, and 9) is perhaps even more important.[1]

So far, therefore, as regards *mental* character, the theoretical argument is all in favour of the Montessori education for the very young.[2]

But a further question remains—what is its effect on moral character? Take, as an example, the case

[1] From this point of view their work is finished when the child turns them into soldiers, and his big brother of five suggests that the holes shall be trenches and the block of wood a fort, as a critic puts it. They have then become a stimulus for the imagination and the result is a play—it is no longer a suitable training in the *rational* treatment of ideas. If we desire to continue such training, we should provide other material (see p. 235). We are indeed told by the critic that the whole business is now spiritualised, that it has become a human thing which we can all watch with interest, and he complains that "of this kind of escape from the prison-house of didactic materials there is not a word" in Dr. Montessori's book. But can we not watch with a still higher interest and sympathy the working of the child's mind as he grapples with a problem which it requires all his energies to solve? For work is a more distinctively human thing than play, and man is a rational as well as an imaginative animal. And, judging from the photographs, the "prison-house" seems to be a pleasant as well as an interesting place.

[2] With regard to older children, and in regard to book work, there is a record, the reference to which the writer cannot remember, of a school conducted on the same lines, *e.g.*, an arithmetical class of over twenty children was conducted on the individual principle, each child progressing at his own rate, with such individual help as the teacher could give. The result as described was much beyond that of other schools.

of a very passionate boy, one who, on the slightest provocation, hits out with his fist. Such a speedy response is not " natural," it is a growth, and, looking at it from the secular point of view, we have to inquire —so that we may avoid it—what kind of education favours this growth ? Dr. Francis Warner has carefully described the successive steps of the process as it commences in the young child ;—A sharp word is spoken ; you see a rising pucker on the face ; the mouth gets drawn down ; the circulation of the blood alters, as we see by the flushed face ; the breathing grows irregular ; there is usually a storm of tears as the fists clench ; the muscular movements increase ; the child hits with his fists and stamps, then the tears clear away, the eyelids open, the eyes fix themselves on the object of resentment, and the feeling of anger attains its full intensity.

When a long process like this is often repeated, the intermediate steps tend to disappear. It is just like learning to play the piano. At first the child looks at the written note, at its finger, and at the piano, and then carefully puts its finger down and strikes the note. With long practice, only the first and last movements remain—no sooner do the eyes see the written notes than the fingers play them. So the boy who is allowed to practise getting into a passion learns to play upon the instrument of his emotions until the intermediate stages disappear and the blow becomes the direct and instant response to the provocation.

Thus the sudden storm of passion which overrides

the higher personality is a product of practice, just as is piano-playing, and the same thing is true of almost all conduct in which the higher personality has no opportunity of interfering before the response has been made. If, then, we would secure for the developed personality of the boy the fullest opportunity to control the lower tendencies, we must give as little opportunity as possible for the child to indulge himself in practising that which we would repress in the boy. For this reason it is important to avoid irritating or opposing the child except when we must, *e.g.* when he is guilty of offensive actions to others. In such a case it is desirable to interrupt the objectionable process as early as possible, so that it will not be completed, and therefore will not become habitual, and, if possible, the interruption should be by substituting some desirable emotion for the objectionable one, just as the process of crying was interrupted by the little girls in the tenement house, and a desirable emotion substituted (see note, p. 201).

Although this method of early education will not by itself give the higher personality much practice in overcoming the lower personality or the physiological tendencies of the organism, it will indirectly help to secure its predominance by weakening the lower tendencies. Directly, this predominance is to be secured by affording to the higher elements of the personality plenty of practice in controlling actions which are not too strongly opposed by the lower elements.[1]

[1] Not too strongly opposed; for though we may profit much from reflection upon occasional failures,—forewarned is forearmed,—it is

Such practice will tend to effect its object even though the conflicting elements are not consciously opposed.

It may be objected that such an education tends to minimise the feeling of duty, of moral obligation. But that is the true ideal of all moral education. The perfectly moral being never acts from a sense of moral obligation, just as the motive of the innately law-abiding individual is never that he may escape the clutches of the law. The feeling of moral obligation, of duty, is evidence of moral imperfection; when that feeling has done its perfect work, it drops out of sight. He who, seeing another lose a shilling, returns it to him as a matter of course is so far on a higher moral plane than he who, strongly tempted to retain it, returns it under the pressure of a feeling of moral obligation. Yet it is the latter whom we praise, because he has fought against temptation and conquered it. And there is reason in this. He who, brought up in harmony with his surroundings, has never been tempted to do wrong, may live, respected and respectable, all his life, but we do not feel the same confidence in him as we do in the man who has struggled with himself until the inmost recesses of his own nature have been laid bare to himself, and who has thus overcome what was base or unworthy. Yet for one soul made strong by such bitter conflict, in how many may not the lower elements overcome the higher? And for children, the time for

by overcoming temptation, not by yielding to it, that we acquire moral strength; nor have little children reached the stage at which reflection is fruitful.

such conflicts has not come. When it does come, they will not be the worse equipped to meet them because, in their young lives, the higher elements have been encouraged at the expense of the lower. For them, at least, the prayer must be "Lead us not into temptation." It is in the years of adolescence, when the harmony between the outer environment and the inner nature is all upset by the rapid changes within, it is then that the strong soul cries aloud for strength to overcome the temptations into which it is inevitably led. It is for that period of stress that early education should prepare. Little by little we must give strength to the higher personality to overcome the lower.

The Montessori education, though for the most part it gives this preparation unconsciously, does give direct opportunity for conscious conflict and moral self-control, and that not only in the moral sphere, where unsocial actions are repressed by external authority, but in the intellectual sphere as well. In the self-restraint of the games of silence, in the self-denial in the game of zero, there is direct moral self-control. And it is interesting to observe that just as mental discipline is obtained, not through exhortation to attend to the didactic material, but through giving occupations which engross the attention, so here the moral control by which the higher personality is enabled to resist the antagonisms of the lower personality or the demands of the physiological character, is obtained not through exhortation, or through fear of punishment or hope of reward, but

by giving occupations in which the natural tendency is to secure the victory for the higher personality. This is the tendency of all modern education. The old custom of impressing on children, by the fear of punishment, that they were *not* to do this and *not* to do that, so that in their lives the element of repression was prominent, is being gradually replaced by the happier one of providing such good and interesting occupations that the temptations to wrong or undesirable action are reduced as far as possible. There can be no doubt that this is a change in the right direction. It is a change from law to grace, from the method of the Old Testament to that of the New. In the old dispensation, it was sought to secure right action by a code of prohibitions. Of the Ten Commandments, one only—the commandment to honour parents—is definitely positive, eight of the remaining nine are certainly prohibitions. In the New Testament the change from the negative to the positive is complete. Rightly to love God and one's neighbour, this is the whole of the Law and the Prophets. Not the life of enforced prohibitions, but the life of spontaneous righteousness, that is what we must strive to attain. And this change in the point of view is typical of all progressive thought.

Yet it must not be forgotten that it was not by this kindly method that nature first raised man in the scale of creation. Not pleasure but adversity was the greatest teacher of mankind. It was not in those happy lands where nature provides with

luxuriant profusion all the necessaries of existence, that man rose from savagery to the highest civilisation. The history of progress is a history of striving, and often of conscious toil in the present for the sake of bare existence in the future. It is indeed very remarkable that those educationists who, like Spencer and Montessori, insist most strongly that the education of the individual should follow the evolutionary education of the race, are the very ones who also maintain most strongly that education should be intrinsically pleasurable; that the motive for work should always be the direct one of interest in the work itself, not the indirect one of avoiding future pain or providing future gratification. Thus Dr. Montessori says of the medical student "that if he works in the hope of an inheritance, or of making a desirable marriage, or if, indeed, he is inspired by any material advantage, he will never become a true master or a great doctor, and the world will never make one step forward because of his work. He to whom such stimuli are necessary had far better never become a physician."

No doubt there is something in this; to be devoted to work for its own sake is the most fruitful attitude of mind. But it is best to admit at once that statements like the above misrepresent the facts; and by putting the reader into a critical frame of mind they detract from the effect of the passages which follow, which are of rare and exquisite beauty. It is not merely that they are exaggerations; they are directly contrary to the teaching of life and of evolu-

tion. The early progress in self-control, as in power of self-denial, by which civilised man rose above his savage origin, was due to this very motive which Dr. Montessori holds so low. This progress had its root in thrift, using the word in its wide sense of prevision, looking ahead, basing present action not on immediate desires, but on future consequences. And Nature's penalties for want of prevision were far more severe than ours—they included even the extermination of the race when brought into competition with other races, more careful of the future. "The jockey," writes Dr. Montessori, "offers a piece of sugar to his horse . . . the coachman beats him ; . . . and yet neither of these runs so superbly as the free horse of the plains." Why ? Because a thousand enemies lie in wait for the "free" horse ; if he does not run superbly he perishes in the inexorable contest of nature.[1]

Happily, however, the objection is rather against Dr. Montessori's theory than her practice. If the upholders of the evolutionary theory of education had advocated pleasurable interest as the prime factor in the education of the very young only, they would at least have escaped the criticism of inconsistency. For the struggle through which the greatest progress was made was the struggle of the parent

[1] And even in the word "superbly" there lies a fallacy, for it implies excellence ; and the free horse does not excel in all respects – if he gallops more superbly than the race-horse, he does not gallop so fast ; if he walks more superbly than the cart-horse, he could not draw so great a load.

to provide for the young and helpless offspring an environment not only free from suffering and struggle, but directly pleasurable. Thus the teaching of evolution fully justifies the belief in immediate interest rather than effort as the keystone of *early* education; and Dr. Montessori's own experience bears this out. She did not originally object to prizes as a spur to effort. It was her children who taught her that prizes were unnecessary; were a hindrance, not a help. Thus in the games of silence, they *forgot* her promise of sweets if they remained silent—and she gave up such rewards, having discovered, as she says elsewhere, that his own self-development is the child's greatest pleasure. There are but few who will not agree that if, without offering immediate material rewards, we can get the children to do as much and as good work as when such rewards are offered, then it is best not to offer them. For one thing, the material rewards in life are usually long delayed—hence what we value is the power to work for a long delayed reward. But the promise of such rewards has but little effect as a motive power until the period of adolescence, when the future begins to loom larger than the present. If indeed we could, by commencing with immediate material rewards in the early years of childhood and, gradually delaying them as the child got older, lead him to work steadily for far-distant rewards, that would be a strong argument for beginning with immediate material prizes.[1] But the actual

[1] There would still remain the very serious objection that fine natures are not so obtained—the utilitarian, if he be also a psycho-

effect is just the contrary—we are more likely to create a craving for the pleasure or excitement given by the reward, whether it has been earned or not—a craving from which many ill-effects follow.

Even the reward of an immediate word of praise, though it is in many respects a most desirable one, is not wholly free from objection. In the Montessori schools, as in all charmingly conducted ones where the whole environment breathes of gentle and loving sympathy, there is a serious risk. Those who are accustomed to such happy surroundings may well shrink and wither under the rough treatment of an unsympathetic world; the stronger among them may rebel with righteous passion against the inevitable injustices of our imperfect social system; the more gentle ones, depressed and discouraged, may sink beneath them. Nor is the world's roughness the only danger; its knavery is another. Against many forms of knavery the mere fact of being a steady worker, and one who looks for little reward save in the work itself, is a great protection; and there is reason to expect that this will be a characteristic of those who are educated on the Montessori principles. But certainly, if we educate children in a world whose moral level is far above that of the world of life, they must, when they come to the proper age, receive definite teaching about the snares laid for the innocent, and how they are to be avoided.

logist, knows that to seek directly for happiness is not the best way to obtain it; and so it is with utility—we are seldom really successful when we make it our direct object.

Of all the forms of reward, the least open to objection is that which nature, unaided, supplies—the reward of conscious achievement, of increasing power. In this alone there seems no danger, yet even here, when it is coloured by the desire for social approbation, there is some risk, for self-satisfaction may become inordinate.

But even the best external methods of encouragement or of punishment will never by themselves transmit to the child the most valuable heritage of the race. These must come through personal experiences, through mental and spiritual contact with others who, in their turn, have received them in the same way. It lies with each generation to enrich by its own experience what it has received from those who have gone before, and, so enriched, to transmit it to those who follow.

The discussion has been rendered necessary because, while every one who has seen the results of the system is extraordinarily impressed with the calm, happy, and interested character of the children, there are many who hold that in this case the child is not the father of the man, and that the effect in later life will be that the children will grow up without moral or mental fibre. Here, as in all things educational, we must preserve a temperate judgment, for the proof of the pudding is in the eating. And since we cannot eat the pudding before it is cooked, all that discussion can be expected to do for a new experiment is to enable us to judge whether it is worth trying; and if we so decide, to enable us to experiment with a

clear knowledge of what we are about to do. To show that the experiment is worth making, nay, that we are bound to make it, and to help in making clear the principles on which it should be made, is the modest object of this little work.

INDEX

Absorption, the test of good mental work, 180, 182, 233, 234.
Acquired characteristics, 68.
Actions, not easy in themselves, 173; three stages in learning, 171.
Afferent fibres, 31.
Ambidexterity, 157.
Anaxagoras, 43 n.
Anger, 162, 292.
"Antagonisms," 161, 164, 190.
Anti-social tendencies, 166, 167, 174, 191.
Ants, 66, 67.
Apparatus, the Montessori, hygienic and didactic, 214 f.
Application, Herbartian, not to be suggested by teacher, 237.
Arithmetic, 271 f.
Arms, strength of, in child, 214 f.
Army, as analogue of nervous system, 27 f.
Art, how to teach an, 46, 126.
Articulation, need of teaching, 150.
,, and thought, 151.
Attention, 61, 95, 180; called to different parts of body, 220, 239; wandering and remedy, 283 f.
Authority, justification of, 164, 190.
Automatism, 60.
Aveyron, wild boy of, 15, 107.

Baby, characteristics of, 69, 78.
,, compared to monkey, 78 n.
,, ,, to savage, 78.
,, educative play of, 70.
Ball, Prof. V., on wolf children, 108 f.
Bees, 64–66, 75.
Berry, on imitation in cats, 94.
Bicycle riding, 46, 73, 125.
Biogenetic law, 83 n.
Birds and imitation, 93.
Blind, delicacy of touch in, 58.
Brain, 25; developed through hand, 16, 39–45, 57 f.
,, developed through sense and muscle training, 45 f.
,, of monkeys, 27 n.
Breathing, importance of teaching, 217 f.
Broad stairs, 248.
Burial rites of domestic pets, 82.

Carrying objects, 221, 246, 257, 264.
Cat, 63; imitation in, 93, 94.
Chairs, should be movable, 212; how to move, 225.
Character, 277 f.
Chest capacity, importance of, 217–219.
Chicks, instinctive adjustments in, 72 f.
,, educated through spontaneity, 92.
Childhood, terrors of, 245.
Children, games of, an echo of race history, 79 f.; medical examinations of, 100, 212; cannot make fine adjustments, 125; and repetition, 177; should exhaust their impulses, 180; and do their own thinking, 182; should not be kept still, 195; but may keep themselves still, 196; refractory,

100, 212; older should help younger, 220; some types of, 238; and crockery, 264; waiting at meals, 264; may remain quiet during considerable intervals, 196.
Chivalry, education of, 12.
Choice, first appearance of, 280.
Church, education of, 12.
Class teaching, 147, 213.
,, sympathy, 159.
Cleanliness of hand, nails, neck, ears, face, teeth, clothes, shoes, 220.
Colour, exercises for teaching, 252; memory, 252; psychology of, 255.
Colour blindness, 52.
Commands should be such as can be enforced, 169.
should be such as child can execute, 171.
Concentration, mental, 149.
Conceptual level, acquirement of skill on, 47.
Conflict of human tendencies, 71, 161 f., 279.
,, of wills, 164, 174.
Control, mechanical by apparatus, 230.
Conversations, Dr. Montessori's, 210, 221.
Copy-books, disadvantages of, 159.
Copying, difficulty of, 118.
Courtesy, not to be required from the very young, 189, 243 n.
Crockery, care of, 264.
Cubes, 246.
Culture epochs, 77 f.; classification of, 84.
Curriculum, the Montessori, 208, 212, 222
Cylinders, 226 f., 235, 269, 291 n.

Darwin, account of monkey trainer, 95.
Deaf-mutes, education of, by Pereira, 13.
Deficients, education of, in Spain, 13.
Definitions, of real things, unsatisfactory, 87; value of, 88.
Delsartian relaxation, 198.
Democratic ideal in education, 2.
Deppe, 47 n.
Design, 270, 271.
Desks, 175, 214.
Didactic material, 8, 13, 179, 219, 223, 224, 270.
Disciplinary education, 285 f.
Discipline in the school, 167.
Distance, instinctive perception of, in chick, 72.
Dog, intelligence in, 48, 49; and imitation, 93.
Doll instinct, 82.
Draughts, detection of, 53.
Drawing from nature, 270, 271.
Drummond, Dr., 217 n.
Duty, feeling of, 294.

Ear, and power of attending to what is significant, 51, 58.
Education — ancient and modern, 10–12; Greek, 11; of Church, 12; problem of, in physiological terms, 17; physiological, 24 f.; why required by man, 62, 69; of man—animals contrasted, 62 f.; required by man not merely because of complexity of life, 64; not to make adjustments for new combinations, 68; but because of changing environment, 69; of insects, impossible, 64; through play, 70; three aims in, 71; implies establishing new paths of nervous discharge, 74; depends on spontaneity, 74, 90, 92 f., 100; and liberty, 2, 92; of chick, based on its spontaneity, 92; in Montessori system, of senses, muscles, and intellect chiefly by primary spontaneities, but in conduct by secondary spontaneities, 99; old and new, difference between, 101, 103; civilising tendency of new,

102; of the very young must be based on primary spontaneity, 104; and environment, 112, 113; is best founded on the direct spontaneities of the child, 145; true rule of, 168.
Efferent fibres, 30.
Effort, 102, 141, 277–279.
Egyptian type of teacher, 97.
Environment, influence of, 107 f.; and freedom, 92; selective influence of mental, 112; importance of, 112 f., 209, 285; must not determine response, 180; excitement due to unsuitable, 200, 243.
Errors, correction of, 133, 154–5, 278.
Evolution and educational advance, 17; and the development of the race, 42; and human deficiencies, 67; educational indications of, 297.
Eye, training of, 51, 57, 58; correlation with hand, 20.
Examination and spontaneity, 91.
"Explanation," 288.

Fairy stories, 243.
Fatigue, 33–38.
Fay, Miss, 47 n.
Fear, of reproof, 155; of nervous children, 245.
Ferrari, Signor, 94, 96.
Fine movements, difficulty in making, 125–6.
FitzGerald, Bishop, 165 n.
Formal education, 285 f.
Frames for buttoning, etc., 226.
Franklin, 43 n.
Freedom—impossibility of complete, 92; what it means in Montessori system, 173, 190 f.; more reliable as a guide in physical and mental spheres than in social and moral spheres, 200–64; importance of pupil's *feeling* free, 235.
Froebel, 1, 4, 208; games of, 219; gifts, 233, 269; principle of, must not be applied unreservedly, 243.

Galli-saccenta, Signora, 139.
Game, of carrying out written directions, 146, 148; numerical, 275; of silence, 239, 295.
Geometry, preparation for, 260, 263, 268.
Grades, 222; first, 225; second, 240; third, 257; fourth, 264; fifth, 271.
Grafting process in education, 97 f., 101 f.
Greek physical education, 11, 12.
Gymnastics, 11, 214 f.

Hand, relation of, to brain, 16, 39–45; evolutionary explanation of, 43; and eye, co-ordination of, 20; and speech, 40, 42.
Hegel, 77, 166.
Herbart, 208, 209, 236.
Hippocrates, 26 n.
Hobby horse *versus* toy motor, 83.
Holiday of professional man, 83.
Holmes, Mr. E. G. A., 139.
Hutchinson, W., 75.

Idiots, education of, 5, 192 n.; compared with that of normal children, 18–21, 119, 166.
Imitation, 93 f., 197, 239.
Impatience, of adults with children, reasons of, 183 f.; of children, often excusable, 188.
Inattention, training in, 180.
Inhibition in child, 195 f.; of thoughts, 197; of movements, by stimulus to opposing muscle, 198.
Insects, education of, impossible, 64; activities of instinctive, 65.
Insets, 260; metal, 268.
Inspection of children and schoolroom, 220.

Instincts, of young animals well adjusted, of children often ill-adjusted, 62 f.; may govern actions performed only once in a lifetime, 65, 66; formation of, 68 f.; some must be repressed, 70; and spontaneity, 74.
Interest, educative, 160; danger of fleeting interest, 180, 182.
Itard, 3 n., 15, 101, 107, 117, 258, 260.

Jewish teacher, saying of, 7.

Kant, 166 n.
Kea parrot, 94.
Keller, Miss H., 15 n.
Kitten, play of, 62.

Laboratory, psychological, 176.
Large movements, importance of, 127.
Left-handedness and stammering, 156.
Letters, mode of teaching, 133.
Liberty, principle of, 161 f.; in schoolroom, 175; not a fetish, 202.
Licence and liberty, 2.
Line, walking on, 264.
Liszt, 47 n.
Locke, 279
Long stairs, 249, 272.

Make believes, 81, 244.
Manual deficiency related to mental ditto, 39 f.
" Mechanical " responses, 89, 116.
Medical inspection often reveals cause of bad conduct, 100.
Mental character, 277 f.; concentration, 149; effort, 278, 279; discipline, 285 f., 295.
,, education through hand, 16, 39 f.
Monkey, 27 n., 43, 78, 93; and education, 95 f.
Moral control, establishment of 169–70.
Morgan, Prof. Lloyd, 48, 67 n.
Mother, in besieged town, 58.
Motor activities, importance of, in child life, 195; control dependent on sensory indications, 32 f., 56.
Motor memory, 120 f.; for angles, 121; in drawing, 123.
Movements, physiological analysis of, 118; importance of beginning with large ones, 125–7, 152; should be graceful, 221; exercises in, 264.
Muscular control, three stages in acquiring, 171.
Muscular and mental training, 46, 59.
Muscular training, dangers of, 60.
Montessori method, applied to older children, 291 n.
Montessori, her place in education, 1, 8; educational training, 4–7, 20–22; individuality, 22; personality, 2, 114, 192; and Séguin, 4–6, 15–19, 21, 166 f.; and Culture Epoch theory, 78; and evolution, 297; and spontaneity, 18, 21, 22, 71, 99, 138, 141, 144–5, 147, 167 f., 191; and self-expression, 116, 158–9; as an Herbartian, 210; disapproves of undue effort, 277.
Moral character, 277 f.; effect of Montessori system on, 291.
Moral obligation, 294.
,, self-control in the Montessori system, 294 f.

Naughtiness, often a safety-valve, 167.
Nerve paths and disciplinary education, 289.
Nerves and nervous system, 24 f.; nerve cells, 24, 25; must be trained to act in concert, 179; sensori

and motor, 25; neurons, 25; nerve centres, 25, 26, 29; and voluntary movement, 27; nuclei, 26; fibres, 25; crossing of, 26, 40; currents—short circuiting of, 27; sensory or afferent, 30; motor or efferent, 31; are continuous, 29-31; interdependence of motor and sensory nerves, 32 f., 56; system—analogy with army, 28; always active, 30, 31, 32, 34–38; fatigue, 34–38; and gymnastics, 36; developed through use, 38; especially of hand, 39 f.; also through sense and muscle training, 54 f.; developed through repetition, 179.
Nervous breakdown, 35.
,, energy, danger of interfering with spontaneous discharges of, 194.
New Testament morality positive, 296.
Nomenclature, to teach, 132–4, 235; not Nature method, 236.
Numeration, teaching of, 271; games for, 275.

Obedience, 164, 170, 190.
Old age and second childhood, 76.
Optical delusions, 122.
Organisms, peculiarity of, 88.
Original sin, biological significance of, 70.

Pain, immoral use of, 105.
Passion, sudden storm of, 292.
Perceptual level, skill on, 47; necessary conceptual efficiency, 50.
Pereira, 13–15.
Periods of Séguin, 134.
Persian school, noise in, 177 n.
Person, care of, should be taught, 220, 221, 264.
Personality, gradual growth of, 280 f.; higher *versus* lower, 293.
Pestalozzi, 1, 3.
Pets, 82.
Physiological foundation of education, 10; statement of problem of education, 17; analysis of movements, 118; processes involved in copying, 118.
Physiological character, 282, 283.
Piano playing as a type of acquired habit, 293.
Pinel, 13.
Pizzoli's disk, 254–6.
Plastic work, 270, 271.
Plato, 11.
Play—of kitten is its education, 62; of baby is educative, 70; purposeful, of children, 77 f.
Pleasurable excitement, not the test of the best work, 182.
Poise, 220.
Preyer, 19; his baby, 178.
Process, not result, 177 f., 187 f.
Professional man's holiday, 83.
Prowls, 80 n.
Psychological laboratory in the schoolroom, 176.
Psychological character, 282.
Punishment, 104–106, 212; and reward, 106, 170, 295–6; and monkey, 96, 97.
Puzzle instinct, 95.
Puzzled expression, its significance for the teacher, 183, 185.

Quintilian, 123.

Reading—teaching of letters by Séguin's method of contrast, 132-3; error not revealed, 133; three periods of Séguin, 134; composing words, 135; reading what he has composed needs effort, 135; to read what others have written needs much effort, 141–3; result of violation of principle of spontaneity, 143–5; games for reading of phrases, 145–6; earliest reading should be

silent, 147; parrot reading, 148; mental concentration taught in, 148–9; suggestions for teacher in ordinary schools, 149; good reading, almost a lost art, 150; in fifth grade, 271.
Redundancy in baby movements, 73.
Refractory children, 100, 212.
Repetition, 135; importance of, 177 f.; in adult life, 178 n.
Repression, 71, 164, 166, 167–8, 201, 296.
Reward, 2; and punishment, 106.
Rhythmic exercises, 264, 271.
Rights and duties, Séguin on, 165.
Romulus and Remus, 108.
Rousseau, 12–14.

Saint Paul, 282.
Salmon, Mr. D., account of reading aloud, 143, 148.
Sanichar, the wolf man, 108.
Santa Claus, 244.
Savage of Aveyron, 15.
Savage compared to baby, 78.
Schoolmaster, ceremony of inception of, 104.
Schoolroom, the Montessori, 208, 212.
"Seeing with hands," 269.
Séguin, 3 n., 4, 5, 6, 13, 14, 15, 17, 19, 20, 21, 39, 100, 101, 107, 119, 120; method of contrast, 132–3; three periods, 134; on "antagonisms," 161–171; on sympathy with children, 4, 21, 192.
Self-control, gradual growth of, 280.
Self-expression in writing, 115 f., 149, 159.
Sense training, need of definite, 51 f.; is brain training, 57.
Shapes, recognition of, plane, by touch, 260; ditto, of solid objects, 269.
Silence, games of, 239, 295.
Skill and knowledge, 40.
Skin, repair of, 66 n.
Soft pedagogy, 180.
Sounds, discrimination of, 258.
Spalding, experiments on chicks, 72.
Sparrow as instance of survival of fittest, 68.
Spencer, Herbert, 2, 77, 78, 106, 181, 297.
Spontaneity, 62 f.; and culture epochs, 76 f.; definition of, 85 f.; and education, 92 f.; higher and lower, 100 f.; and environment, 107 f.; in teaching idiots, 21; and instinct, 72 f.; purposeless, of baby, 74, 77; purposeful, of children, 77 f.; and examination, 91; of birds, the basis of their education, 92, 96; of child, very extended, 93 f.; creation of new, by grafting, 97 f.; importance of proper selection in grafting, 103; direct or primary, indirect or secondary spontaneities, 99; higher and lower, 100; nature of, transformed by civilisation, 103; may disappear unless developed at the right time, 111; and environment, 112; Dr. Montessori on, 191; principle of, may be safely applied with the very young, 193; danger in interfering with, stated physiologically, 194 f.; but some must be suppressed, 70, 100, 101, 167 f., 191, 201.
Stages in learning actions, 171.
Stairs, broad, 248; long, 249, 272.
Stammering and left-handedness, 156.
Stamp collecting impulse, 101–2.
Stimulants, mental, child should not be allowed to indulge in them, 243.
Stoics, 283.
Story, the, 241 f.; as mental discipline, 286.
Suggestion as an aid to quietness, 197.
Swimming, physiological method of teaching, 117.

Tactile exercises, 251.
Teacher, Montessori, has need for special skill, 234.
Teaching of activities necessary, 276; to move quickly, 221; poise, 220; washing different parts of body, 220, 250; older children to help younger, 220; to lift, carry, and set down objects, 221, 264; washing the person, 220, 250; crockery, care of, 264.
Temperature, judging of, 251.
Ten Commandments, 296.
Tenement house, little girls in, 201 n.
Tenseness, 198; energy wasted in, 198; injurious, 199.
Three periods of Séguin, 134.
Thring, 151.,
Thumb, 43.
Time must be allowed to child, 142, 173, 184.
Time-table, the Montessori, 222.
Touch, advantages of a gentle, 129, 264; exercises for, 250, 251.
Tower, the, 247.
Toys, mechanical, 82; should be sparingly supplied, 180.
Tribe life, games founded on, 81.
Trouble, educational dangers in avoiding, 187.

University students and mental discipline, 185; often lack perceptual foundation for geometry, 263.

Voluntary control, three stages in growth of, 171; easily weakened, 172; in sitting still, 195 f.
Vowels, teaching of, 133; colouring of, 132, 268.

Warner, Dr. F., 292.
Washing should be taught, and reasons explained, 220, 250.
Water colours, 270, 271.
Weights, estimation of, 257.
Wesley, 71.
Wild children, 107 f.
Wills, conflict of, 164, 174.
Wolf-children, 108 f.
Words, difficulty of reading, 141 f.
Work and play, 62, 291 n.
Writing, a means of expression, 115–7; perfection of, 116; geometrical analysis of letters differs from physiological analysis of actions, 118; physiological processes involved in copying, 118–20; motor memory in, 120–3; begin with large movements, 125–7, 152; direction must be taught, 128; how to feel objects, 129–30; control of pencil, 131–2; intellectual element in, 132 ff.; teaching letters, 133–4; error not revealed, 133, 155; the three periods of Séguin, 134; composing words as preparation for, 134–6; pupil must not write until there is an impulse to express himself, 134; unless this impulse is delayed too long, 138; spontaneous writing, 136–8; Mr. Holmes' account, 139–40; writing phrases, 145–6, 148; application of method to ordinary schools, 152; importance of beginning with *good* writing, 153–4; writing quickly, an art to be specially taught, 154; left-handed pupils and stammering, 156–8; should not be merely a mechanical art, 158; a disadvantage of copy-books, 159; the pupil's interest should be mental, 160; jerky, due to tenseness, 200; sequence in grades may be misleading, 223; in fourth and fifth grades, 266, 271.

Zero game, 275.

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